AVIATION WEEK

A McGRAW-HILL PUBLICATION

MAY 16, 1955

50 CENTS

Sundstrand powers VOODOO's electrical system

Sundstrand builds the Constant Speed Drive and its related controls for the 400-cycle electrical system of McDonnell's F-101 Voodoo, a new supersonic, long range fighter capable of delivering atomic weapons. And many other advanced aircraft depend upon a Sundstrand-driven 400 cycle electrical system, because such a system is efficient, versatile, and capable under all conditions. The Sundstrand Drive makes possible a completely automatic, parallel, constant frequency a-c system, with full rated electrical system power, plus overload capacity, available from engine windmill to full thrust. That is why the Sundstrand Drive is used on more types of aircraft than any other constant speed drive. For complete details, check with our home or district office.

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CONSTANT SPEED DRIVES • AIRCRAFT ACCESSORIES

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

New De-Icers mark B. F. Goodrich's 25 years of leading fight on ice

New chordwise De-Icers improve airflow

You're looking at the most efficient ice protection yet developed—new B. F. Goodrich chordwise De-Icers.

The small rubber tubes that inflate to snap off ice are built chordwise, in line with the air stream. This enables the De-Icers to maintain a smooth flow of air over the wings even during the brief three-second inflation cycle.

New BFG chordwise De-Icers are standard equipment on TWA's Super-G, above, also Lockheed's 1049-G's for Northwest. They climax 25 years of leadership in the fight against ice. We first gave airplanes ice protection in 1930. Here's how we started...

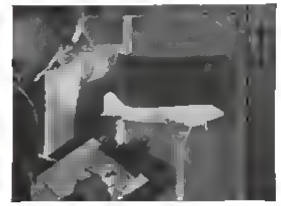
1927—Most planes still grounded in cold weather. Ice often forces airmail pilots to turn back or bail out.

World's first ice protection system, BFG De-Icers tested on Douglas mail plane.

1928—Dr. William C. Greer and B. F. Goodrich engineers develop world's first ice protection—a rubber "overshoe" containing inflatable tubes that crack off ice. Copyrighted name: De-Icers.

1929—First flight made by planes with test sections of De-Icers.

1930—First flight of a plane completely equipped with De-Icers. Although hand pumped, BFG De-Icers bring plane through severe icing conditions.



B. F. Goodrich builds world's first refrigerated wind tunnel to speed work on ice problems.

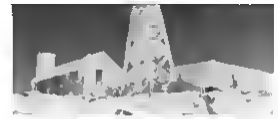
1931—BFG's "Miss Silvertown" is first plane to have engine-driven pump for inflating De-Icers.

1932—First commercial installation of De-Icers on fleet of Northrop Alpha mail planes. Soon followed by installation on Boeing 247's, Douglas DC-1's and DC-2's, Martin B-10's and pursuit ships piloted by Jimmy Doolittle.

1936—By now De-Icers have been made more efficient by increasing number of tubes and making them smaller.

1938—B. F. Goodrich develops De-Icers for 4-engine flying boats and transports.

1940—Improved air operating system results in faster tube inflation-deflation.



B. F. Goodrich pioneered use of Mt. Washington, N. H., for aircraft ice removal tests.

1942—Every U. S. combat bomber and personnel-carrying transport is equipped with B. F. Goodrich De-Icers. Throughout war, dependable De-Icer operation saves thousands of lives, many planes.

1943—Solenoid manifold distributor system with electronic timer gives infinite variations of De-Icer control. This new De-Icer control system used on B-29's flying on first Tokyo raids.

1948—100,000th BFG De-Icer installed. All major airlines that fly in icing conditions use De-Icers.

1952—New super-small cube De-Icers installed on all Super Constellations. Cemented on, new De-Icers eliminate fairing strips, assure longer life.

1955—First B. F. Goodrich chordwise De-Icers installed on Lockheed 1049-G's.

Only B. F. Goodrich makes De-Icers. Only B. F. Goodrich can give you the proved advantages of De-Icer protection. For special applications, B. F. Goodrich has also paralleled De-Icer progress with developments in chemical and electrical ice protection. *The B. F. Goodrich Company, Aeronautical Sales, Akron, Ohio*

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FIRST IN RUBBER

Aviation Week

MAY 16, 1955 VOL 62, NO 20

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Aviation Week is served by PRESS ASSOCIATION, INC., a subsidiary of Associated Press

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AVIATION WEEK ■ MAY 16, 1955 ● Vol 62, No 20
Member ABP and ABC

Published weekly by the McGraw Hill Publishing Company James H. McGraw (1860-1948) Founder Executive, Editorial Advertising and Subscription Offices McGraw-Hill Building 330 West 42nd Street, New York 36, N. Y. Publication Offices 99-129 North Broadway, Albany 1 N Y Donald C McGraw President Paul Montgomery Executive Vice President Joseph L Frandl Vice President and Treasurer John J Cooke, Secretary Nelson Bond, Executive Vice President Publications Division Hugh J Smith Vice President and Editorial Director Joseph H. Allen Vice President and Director of Advertising J E Blackburn Jr. Vice President and Circulation Director Subscription Address correspondence to AVIATION WEEK—Subscription Service 99-129 North Broadway, Albany 1 N. Y or 330 West 42nd St., New York 36 N Y Allow 10 days for change of address Subscriptions are solicited only from persons who have a commercial or professional interest in aviation Position and company connection must be indicated on subscription orders

Single copies 50¢ Subscription rates United States and possessions $6 a year, $9 for two years, $11 for three years. Canada $8 a year, $12 for two years, $16 for three years, payable in Canadian currency at par Other Western Hemisphere and the Philippines $10 a year, $16 for two years, $20 for three years. All other countries $20 a year, $30 for two years, $40 for three years. Entered as second class matter July 16 1947 at the Post Office at Albany N Y under Act of Mar 3 1879 Printed in U S A. Copyright 1955 by McGraw Hill Publishing Co., Inc. All Rights Reserved. Cable Address McGraw Hill New York. Publications combined with AVIATION WEEK are AVIATION NEWS, AIR TRANSPORT, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights to these names are reserved by McGraw Hill Publishing Co.

Damestic

Convair 340B, new version of the twin-engine airliner with reduced cabin noise plus increased speed and payload (AW Mar 28, p 87) is going into production at the company's San Diego plant. Deliveries are expected to start within 12 months. Continental Air Lines has purchased seven early delivery positions on the assembly line. USAF and Real S.A. Transportes Aereos of Brazil have taken two each.

Elfaka approach lights will be tested at McGhee-Tyson Airport at Knoxville, Tenn., under a joint civil-military evaluation program. Conducted by Civil Aeronautics Administration and USAF, tests of the Dutch-designed flushed-mounted lights will endeavor to settle civil-military differences over approach configurations (AW Jan. 10, p 21). Knoxville was chosen to permit additional evaluation by airline pilots. Final program depends on a cost allocation, still to be worked out.

F-89H Scorpion, new version of Northrop Aircraft's twin-jet all-weather interceptor, is being built for USAF at the company's Hawthorne, Calif., plant, confirming AVIATION WEEK Mar 21, p 10.

Richard E. Horner, general engineer at USAF's flight test center, Edwards AFB, Calif., has been sworn in as Deputy for Requirements to Trevor Gardner, Assistant USAF Secretary for Research and Development.

Stanley Aviation Corp. will consolidate all engineering and production activities at its new Denver factory this summer, and close its Buffalo, N.Y., facility, which was used for the past year for research and development.

Riddle Airlines purchased four Douglas DC-4Bs last week, for service on its personnel and freight airlift for Air Research and Development Command. Three DC-4Bs were from Capital Airlines and one from Los Angeles Air Service Co. Total cost including spares more than $2 million.

Four Republic F-84Gs will fly 4,840 miles nonstop May 18 from Itazuke AFB, in southern Japan, to Williamstown, Australia. The fighter-bombers will be refueled by tanker planes over Guam, Manus Island and Townsville, Australia.

Ivan H. Driggs, 61, chief scientist at the Naval Air Development Center at Johnsville, Pa., died May 8. An associate of the late Orville Wright, Driggs developed retractable landing gear and a significant part of the vertical takeoff fighter designs.

William A. Wheatley, 56, who set up United Air Lines' education program for schools and colleges, died May 3 in Los Angeles.

Up, Over and Thraugh

McDonnell's XV-1 pressurejet-plus-propeller convertiplane takes off on its first trip over the hangar between hovering and forward flight, thus becoming the first convertiplane to make the transition. Pressurejet rotor drive enables rotor rpm in autorotational forward flight to be dropped to half its hovering rpm, unloading the blades. Forward propulsion is from the pusher propeller powered by a Continental R975-19. That engine also drives compressors that supply high pressure air to the McDonnell-developed rotor tip pressurejets, located on the tip of each blade.

Financial

Lockheed Aircraft Corp.'s net profit for the first quarter of this year totaled $4.6 million, a 4% decline from the same period of 1954. Sales dropped 12% to $190 million.

Eastern Air Lines' net profit for the first quarter of 1955 increased to an all-time high of $2,348,000, more than double the $1,139,000 for the first three months of last year. Gross revenues were $52,773,000, a 19% gain.

National Airlines reports record operating revenues of $16,239,000 for its third quarter ended Mar. 31, 26% higher than the same period last year. Net income totaled $1.7 million, compared with $1,248,000. Operating expenses increased 19% to $12,704,184.

Northwest Orient Airlines had a net loss of $532,569 for the first quarter of 1955, compared with deficit of $1,437,465 during the first three months of last year. Operating revenues increased to $13,963,327, highest first quarter return in NWA's history.

Okanagan Helicopters, Ltd., Vancouver, reports a net profit of $41,449 for 1954, highest so far for the Canadian copter operator. Gross revenues increased nearly 50% to $738,000.

Bell Aircraft Corp., Buffalo, N.Y., declared a 50-cent dividend on common stock, payable June 30 to holders of record June 15.

International

Two Comet 1As will be modified for the Royal Canadian Air Force by de Havilland Aircraft of Canada, Ltd., at Toronto. The company will incorporate changes recommended after a British court of inquiry found that metal fatigue caused the Comet crashes.

Air India International inaugurated direct Constellation service between Bombay and Tokyo last week, will operate one flight a week on the new route.

Trans-Canada Air Lines reports the average load factor for Vickers Viscount reached 87% during the first month of operation on TCA's Toronto-New York route. Other Viscount load factors: Montreal-Toronto, 86%, Toronto-Lakehead, 81%, and Lakehead-Winnipeg, 63%.

The Aviation Week

May 16, 1955

WHO'S WHERE

In the Front Office

Maj. Gen. Victor E. Bertrandias, vice president of Hammond Manufacturing Corp. and its new subsidiary, Air Logistics Corp., both at Pasadena, Calif.

John C. Holley, vice president-sales, Holley Carburetor Co., Van Dyke, Mich. **Arleigh J. Hess**, manager of Holley's aircraft activities.

William A. Yost, Jr., vice president-staff operations, Allis-Chalmers Manufacturing Co., Milwaukee.

F. Earle Cazayoux, vice president finance, Libbey-Owens-Ford Glass Co., Toledo, Ohio.

Allen B. Hemsohn, executive secretary, National Pilots Assn.

Honors and Elections

Lt. Gen. James H. Doolittle, vice president of Shell Oil Co., elected president of the Wings Club, Inc., New York.

William E. Boeing, founder of Boeing Airplane Co., received Seattle University's 1955 Economic Statesmanship Award.

Donald A. Quarles, Assistant Secretary of Defense, **William T. Schwendler**, executive vice president of Grumman Aircraft Engineering Corp., and **Frank N. Piasecki**, former board chairman of Piasecki Helicopter Corp., awarded honorary doctorates in engineering from the New York University College of Engineering.

Changes

Bernard A. Schmeckrath, assistant chief engineer in charge of Pratt & Whitney Aircraft's nuclear project, will be in charge of the new USAF atomic aircraft engine research facility to be operated at Middletown, Conn., by P&WA. Also working on the project: **Guy E. Beardsley**, development engineer, and **C. E. Holtsinger, Jr.**, assistant general manager and coordinator.

Col. Albert A. Arnhym, public information officer, Air Research & Development Command.

Richard Stockwell left American Aviation Publications, Inc., where he had been editorial director since last October.

William Perrault, former managing editor of American Aviation magazine, joined the military sales staff of Lockheed Aircraft Corp.'s Georgia Division at Marietta.

Homer H. Evans, Jr., advertising director, General Dynamics Corp., New York.

D. S. Stewart, Britannia development manager, Bristol Aeroplane Co.'s Aircraft Division.

L. A. Mayberry, engineering manager of Hoffman Laboratories, Inc., Los Angeles.

Gene Lamphear, chief electrical engineer.

Robert W. Jenkins, director of flight operations, Mohawk Airlines.

Adolph Vicek, Jr., tooling manager, Glenn L. Martin Co., Middle River, Md.

Norman H. Golden, chief engineer, Riddle Airlines.

John M. Rogers, manager of Reaction Motors' new West Coast liaison office in Los Angeles.

INDUSTRY OBSERVER

► Lockheed test pilot Herman (Fish) Salmon has flown the XFV-1 vertical takeoff fighter through the complete transition from vertical to horizontal flight and return at least a dozen times at Edwards AFB, Calif. Transition flights all have been made at altitude to provide a safety factor in event of engine or propeller trouble. Salmon reported excellent handling characteristics through the entire transition range including hovering. Takeoffs and landings were made in horizontal position using auxiliary gear.

► Ryan Aeronautical Corp., delta-wing jet-powered vertical takeoff fighter is ready for initial flight testing. The Ryan VTOL is powered by a Rolls-Royce Ltd. Avon axial flow turbojet delivering about 10,000 lb. thrust.

► Boeing's B-52 Stratofortress bomber is equipped with a crosswind landing gear. Boeing is also flight testing huge 40-ft.-long tip tanks for use on the B-52D, longer range version of the Stratofortress.

► Motorists along the public highway that traverses Edwards AFB can see the Chance Vought F8U-1 supersonic day fighter as it takes off from North Base and passes over the highway at low altitude. Recent flights observed used a Republic F-84F as chase plane for the new Vought fighter.

► Confirmation that a new high-speed, high-altitude research plane is being developed for the joint USAF, Navy, NACA piloted aircraft research program was given by Donald Quarles, Assistant Secretary of Defense for Research and Development in Congressional hearings. The plane referred to by Quarles is the 100 mile-altitude rocket-powered research aircraft reported by AVIATION WEEK Dec. 13, p. 11. Quarles said the Navy had proposed the project—Douglas was to be the manufacturer. After the proposal was coordinated to meet USAF and NACA requirements the project was diverted to USAF sponsorship. No manufacturer has been selected yet for the project. Douglas and Bell Aircraft are the main contenders.

► Convair's need for an avionics manufacturing facility to build equipment developed by San Diego division was the major reason behind General Dynamics' recently announced plan to buy Stromberg-Carlson, a Convair official announced. New addition, Stromberg-Carlson, also will develop automatic electronic controls for nuclear powerplants in which General Dynamics is interested.

► Douglas Long Beach Division delivered the last C-124 Globemaster transport to USAF on a total production run of nearly 450 planes. The turboprop powered C-133 transport is now in production at Long Beach as the successor to the C-124 series.

► Lockheed has been assured by USAF of an additional production contract for the supersonic F-104 day supersonic fighter out of Fiscal 1956 funds. This would continue F-104 production beyond the 17 planes already ordered. First production F-104 is scheduled to fly before the end of 1955.

► Convair is still testing its F2Y Sea Darts with both single and double hydro-ski configurations. The single ski plane has not yet been fully flight tested but has made short hops off the water during taxi tests.

► Douglas Aircraft has scheduled the roll-out of its first DC-7 Seven Seas transport for November with the first flight planned for December. Assembly of the center wing spar of the first DC-7C began last week at Santa Monica. Work on fuselage assembly will begin in June.

► Escape for the crew of a Boeing B-52 Stratofortress will provide an exciting sight for detached observers. Entire tail turret blows off carrying the gunner with it. Three of the other five crew members eject upward while two use downward ejecting seats.

► Army and Marines are working together on development of a new high performance observation plane for eventual use by both services.

Washington Roundup

DME Showdown

First real showdown on the Tacan versus VOR/DME controversy will come when the House takes up Civil Aeronautics Administration's budget for fiscal 1956 in the near future.

As recommended by the Eisenhower Administration, the budget now contains $1.3 million for 55 new DME installations.

House Subcommittee on Government Operations of the Military, headed by Rep. Chet Holifield, is expected to sharply criticize government agencies—Navy in particular—for wasting government funds and time in reaching agreement on a common navigational system. The subcommittee report is scheduled for release sometime this week.

Wilson to Face AIA

Defense Secretary Charles E. Wilson feels strongly that West Coast aircraft makers have misunderstood plant dispersion policy as outlined by USAF Secretary Harold E. Talbott (AW May 9, p. 13). Wilson will face the board of governors of Aircraft Industries Assn. at their Williamsburg, Va., meeting this week in effort to convince them there is no threat to California plants in existence. He feels there has been confusion "between broad policy and a specific case." Talbott, Wilson pointed out, "is a direct man. He probably just told somebody."

R&D to Dayton?

There will be a long battle in Congress over the issue as to whether Air Force's Research and Development Command headquarters should be moved from Baltimore to Dayton, as USAF proposes.

First tests will come in connection with the military Public Works Authorization Bill on which House Armed Services Committee opened hearings last week. The Maryland Congressional delegation will fight to have a $6 million authorization for new R&D facilities at Dayton eliminated. The Ohio delegation, with the well wishes of the Air Force, will counterattack.

Ohio Congressmen and Ohio business interests were not aware of USAF's plan until it was announced. But now they are steamed up for action. "Dayton stands ready to assist the Air Force in moving R&D back," Harry Hall, executive vice president of the Dayton Chamber of Commerce, declared.

The second test on the R&D transfer will come in connection with an appropriation bill providing the actual money to implement the authorization—unless the Maryland delegation is successful in eliminating the $6 million item for Dayton facilities from the authorization measure.

Aircraft Investigation

House Appropriations Committee has singled out Defense Department policies on aircraft obsolescence—which determines how many and how frequently planes should be bought—and the aircraft spares and parts program for investigation.

Aircraft obsolescence, the House committee observed, "cannot be avoided, but it can and should be minimized . . ."

Officially announcing the launching of an investigation of Defense Department procurement (AW Apr. 18, p. 11), "The largest area for savings," the committee listed the six subjects it intends to cover:

- Buying only what is determined to be actually needed.
- Buying only in quantities needed.
- Buying new equipment only after thorough going testing.
- Having due regard for necessity to phase out present equipment for new equipment.
- Maintaining effective controls and audits over all procurement processes.
- Developing and retaining experienced procurement personnel.

Speed Airline Deliveries?

Navy's plan to buy cargo planes and lease them to commercial operations has run into the opposition of Sen. Styles Bridges, top Republican on the Armed Services and Appropriations committees.

He proposes higher production priority for planes on order by the airlines to build up airlift, instead.

The Navy isn't using its transports to "the fullest extent possible," Bridges declared in a floor speech, while airlines complain they have to wait 12 to 36 months for deliveries because of the priority given to military production.

Good for GM

Charles E. Wilson's maiden comment on being nominated Secretary of Defense that "What's good for General Motors is good for the country" still reverberates in the capital.

"Since Wilson made that comment 18 months ago," Rep. Henry Reuss told a congressional hearing, "GM's net defense business has increased by $1.7 billion, while that of other automobile companies has decreased by $395 million."

Reuss' comment: "Nash and the other independents would like to have a chance to show what is good for them is also good for the country."

Missile Showing Killed

Navy is proving most sensitive of the Armed Forces in carrying out Defense Secretary Charles E. Wilson's orders to tighten up on release of information about new weapons (AW May 2, p. 17). There has been no formal release of Navy contract information since the directive came out in late March, although newsmen had become accustomed to such information once or twice a week.

Even more recently, a Navy contractor holding security and review clearance to unveil a new guided missile at Bolling AFB on Armed Forces Day, May 20, found that Navy Secretary Charles S. Thomas ordered the display cancelled about a month after approval had been given the project. To make the affair even more muddled, neither the contractor nor security and review officers who had given the okay were notified of the reversal, ordered 24 hours before the Thomas office put a clamp on all exhibits and demonstrations of guided missiles and new aircraft.

—Washington staff

AVIATION WEEK

VOL. 62, NO 20

MAY 16, 1955

AA Nears Decision on Turboprop Order

Outcome of Lockheed-Douglas battle may shape U. S. jet transports sales pattern; designs use T56s.

By Robert Hotz

Lockheed and Douglas are battling in the final round for the first, and what may be the most significant, airline order for an American-built gas turbine powered transport. Prize in this competition is an order from American Airlines as the beginning of a replacement program for its 80-plane fleet of piston powered Convair Liners. American's decision will be made within a few weeks.

Eastern Air Lines is expected to follow American's lead with an order for about 70 turboprop transports.

The two California manufacturers are competing on a new set of performance specifications submitted by American after its earlier turboprop design competition failed to produce an acceptable medium range transport. Convair and Vickers Armstrongs were also in the original competition.

American now wants a 60-passenger plane capable of cruising at more than 400 mph. over a 2,000 mile optimum range. This would enable American to offer nonstop Chicago-Los Angeles service with the new transport in addition to covering all of its current medium haul route segments. Gross weight of the proposed turboprop transport would be just under 100,000 lb. and price is expected to be in the $2 million range.

Operation Goal: 1959

Delivery of the winning design is scheduled to begin by mid 1958. Initial route operations will begin before the end of 1958 with full scale use early in 1959. The turboprop medium range transport will be one of two basic gas turbine types to figure in airline equipment buying plans during the next five years.

The other aircraft will be a turbojet long range type for trans-continental and trans-Atlantic nonstop operations. Boeing and Douglas are competing in this market with their Model 717 and DC-8, respectively.

This is the second occasion in recent years that American Airlines has taken the lead in setting the new equipment pattern for the domestic market. Its sponsorship of the Douglas DC-7 series established the current nonstop transcontinental airline service pattern. If the DC-7 sales pattern is indicative, the winner of the American turboprop competition will sweep the major sales in the first round buying of a California built gas turbine powered transport. Douglas sales of the DC-7 since its original order of 25 from American have climbed to a total of 107 aircraft.

Effects of AA Decision

Other effects of American's decision on the Lockheed-Douglas competition will include:

- Entry of the Allison Division of General Motors Corp. into the commercial turboprop market on a significant scale. Both Lockheed and Douglas designs are based on the Allison Model 501-D10 turboprop, a commercial version of the T56 engine rated at 3750 eshp. (AW Jan. 24, p. 80)

- Dimmed future for continued penetration of the U. S. domestic airline market by the British Vickers Viscount. American Airlines vigorously denied any intentions of buying Viscounts either from Capital Airlines which has ordered 60 or directly from Vickers-Armstrongs Ltd.

- Diminishing sales campaign in the U. S. on the Rolls-Royce, Ltd. Dart 1500 eshp. turboprop. All four earlier turboprop transports in the American competition were designed around advanced versions of the Dart. Two factors combined to eliminate the Dart from competition.

  It did not provide sufficient power for the size and speed American believes necessary for economic operations. It would not be available at its low price ($58,000 including 15% import duty) directly from Rolls due to an exclusive sales arrangement with Vickers that barred Dart sales to any competitors until 1958. Cost of the Dart Westinghouse proposed to manufacture under license in Kansas City ($85,000) was considered too high by prospective airline buyers.

- Determination of Douglas Aircraft's future transport plans. Donald Douglas, company president, recently noted that his firm had both a turboprop and turbojet transport under development but that he had not yet determined which to push first. If Douglas wins the American turboprop competition, it is likely they will have to push the turboprop project to meet the 1958 delivery date. If Lockheed wins the turboprop order, it is likely that Douglas will push its DC-8 turbojet project to try to take the long haul market.

Tanker Rejection

Confirmation of the fact that the Boeing KC-135 jet tanker had been vetoed by top level Defense Department sources was given Congress by Frank Newbury, Assistant Secretary of Defense for Applications Engineering. Newbury told the House Appropriations Committee that his office made a study of the Air Force jet tanker requirements aimed at reducing the number of aircraft types in the inventory.

"Based on a technical review with this principle in mind," Newbury said, "it was recommended that the KC-135 be discontinued and replaced by converted B-36 and B-52 aircraft until such time as the characteristics of a special jet tanker could be more permanently delineated."

Newbury's recommendation was rejected by Defense Secretary Charles E. Wilson who supported the USAF decision to buy the KC-135, both as its alleged "interim" tanker type and again as its purported "ultimate" tanker type supposed to be chosen from the results of a USAF design competition.

New Transport Specs

The following performance specifications have been given Lockheed Aircraft Corp. and Douglas Aircraft Co. Inc. by American Airlines for the development of a medium range turboprop powered transport to replace its current Convair-Liner fleet:

Passenger Capacity	60
Cruising Speed	Over 400 mph
Optimum Range	2,000 miles
Gross Weight	Under 100,000 lb
Powerplants	Four Allison T56 turboprops rated 3750 eshp.

away from Boeing and its Model 717.

Key factor in the future of the U S built turboprop transport will be the Allison Model 510 engine. Earlier engines in the Allison turboprop development program sponsored by the Navy's Bureau of Aeronautics have encountered serious service problems. Most of these problems occured in the propeller gear box and engine fuel controls of the double-barreled T40 using two power sections geared to a single set of contra-rotating propellers. The T56 on which the Model 510 is based uses a single power section and a three-bladed Aeroproducts propeller.

MATS Uses Engine

YT56 engines have been flying experimentally on two Lockheed C-130 cargo transports and two Convair C-131C transports used by Military Air Transport Service. Difficulties with engine fuel controls and altitude performance have been encountered with these YT56 prototypes. Lockheed now has the first production model T56 flying experimentally in one nacelle of a Constellation flying test bed. Initial flight experience with the production T56 indicates these earlier problems have been alleviated and good service performance may be expected. The T56 will power production versions of the Lockheed C-130. By 1958, when first airline transport is scheduled for delivery, there will be about 250 C-130s with over 1,000 engines in military service. Airframe engineers concerned with the American Airlines transport proposal believe there will be ample opportunity to develop a commercially reliable T56 with good overhaul interval as a result of the C-130 program.

General Motors Corp., which previously relied almost entirely on government financing of its Allison Division aircraft operations, recently made a top level policy decision to support this activity with a $75 million investment of corporation funds for better research, development and testing facilities. Allison engineering and top level management has been revised and General Motors President Harlow Curtice has taken a personal interest in the Allison turboprop program. He has consulted with Lockheed, Douglas and American on the commercial Model 510 program and promised full support of the corporation's resources.

Neither Pratt & Whitney nor Curtiss-Wright have a turboprop in the power class desired by the airlines for current projects. Westinghouse planned production of the Dart at Kansas City if a commercial market developed in this country, but it is doubtful if they will tackle it with only the prospects of a Fokker F-27 feeder liner program remaining.

FOA Supports Technical Aid To Pakistan International Airlines

The first official technical assistance program for air transportation has been set up for Pakistan by the Foreign Operations Administration. Other airline assistance contracts under FOA are being negotiated, and that with Turkey is reported to be near finalization.

Pan American World Airways has contracted to provide the technical assistance team to aid Pakistan International Airlines in modernizing and expanding its operations. A twenty-four man PAA team will serve side by side with Pakistani counterparts in operations, pilot training, dispatch, communications, maintenance, traffic and sales, passenger service, treasury and accounting, and supply.

FOA is underwriting the program with $725,000 the first year and plans a contribution of $1,775,000 for the following two years. Pakistan will make a local currency contribution of $121,212 each year. A previous FOA program is aiding Pakistan install air navigation facilities.

▶**Consolidation First**—The technical assistance agreement has been under negotiation nearly one year. The main cause for the delay was over the amalgamation PIA with the domestic Orient Airways. This was completed in Jan.

The consolidated airline is an "autonomous corporation in which the government under present charter will hold at least 51% of the stock. It now owns 65%.

Its equipment consists of two Lockheed Super Constellations, two Convair 240s and 8 or 9 operable Douglas DC-3s. Two or three more DC 3s are claimed by PIA but are not believed to be flyable.

Air transportation has a unique significance to Pakistan. The country is divided into two sections, 1400 miles apart, one on each side of India. Even within each section surface transportation is slow and inadequate for the country's economic development plans.

▶**Emphasis**—Primary emphasis in the assistance program is being placed on domestic service, according to Samuel H. Miller, technical consultant to PAA's executive staff, who has handled the planning for Pan American.

If a priority were to be placed on steps in the program, maintenance would come first, Miller says. On the Super Connies, for example, PIA gets less than three hours utilization per day, compared with a standard of eight to nine hours. Also, the aircraft have to be flown at lower altitudes and slower speeds than their economic best.

Flight operations is next in importance, followed by traffic and sales. There have been no economic studies made of routes, traffic flow.

▶**New Equipment Later**—After finding out what modern management and operation techniques can accomplish in boosting PIA's traffic, then consideration will be given to augmenting the line's equipment, according to Miller. He believes Pakistan will need considerably more aircraft than it now has in order to meet transportation requirements.

Pan American will do no purchasing for PIA under the FOA contract. Miller says the team's objective is to work itself out of a job by training Pakistanis to manage and operate their own airline.

Prior to this FOA contract, the Pakistan airlines were getting advice catch-as-catch-can from any foreigner available for consultation on any problem that happened to develop.

Besides considering assistance for Turkey in air transportation, FOA is believed to be planning help for South Vietnam's Air Vietnam as well as other underdeveloped countries.

Aussie Shapeup

(McGraw-Hill World News)

Melbourne—United States is expected to strengthen the Royal Australian Air Force with consignments of air-to-air and air-to-ground guided missiles plus new jet fighters—possibly Convair's F-102A and the Lockheed F-104.

Aviation experts here predict this aid is forthcoming under plans for closer military cooperation between the U S and Australia.

The deliveries would touch off several problems here. RAAF is short of manpower, and a number of hard-to-spare experts would have to be sent to the U S for training. Ground facilities at many air bases would have to be improved and extended.

But authorities say the new guided missiles and aircraft could be used in campaigns to recruit needed manpower.

National's Net Rises

National Airlines has reported a net profit of $1,700,414 or $1.67 per share, on total operating revenues of $16,239,252 for the three month period ending March 31, 1955. This compared with net earnings of $1,247,894 on gross revenues of $12,861,058 for the same period in 1954.

Pair of Tigers

Two Tigers pause for flight portraits by Grumman's G-21 photo ship to show the latest configuration of the supersonic fighter. Changes from the first prototype include a lengthened nose, extended boundary layer bleed plate ahead of the duct inlets and a larger clear portion of the sliding canopy. Afterburner apparently has been installed on the Wright J65 turbojet. Tiger's claws—four 20-mm. cannon—can be seen mounted in pairs below the engine air intakes. White Tiger (below) carries new Navy designation of F11F-1, unpainted plane (above) has original F9F-9 marking. Leading-edge slats and large-deflection full-span trailing-edge flaps are shown extended. Tiger prototype went through Mach 1 on an early test flight, but the type has since experienced some high-speed stability and control problems. Grumman has a $40-million production order underway, following on the heels of a half-dozen prototypes for accelerated service test.

Airframe Makers Do Not Want To Get Into Avionics—Convair

Dayton—Convair scolded the avionics industry last week for its fears that airframe builders are using the weapon system concept to pull electronics research, development and manufacture into aircraft plants.

August C. Esenwein, Convair vice president and manager of the Fort Worth Division, told the National Conference on Aeronautical Electronics that the airframe industry has enough problems to demand the full attention of its technical talents—"without assuming the unfamiliar burden of black box making."

▶**Dissipated Talent**—E. G. Uhl, vice president and chief engineer for Glenn L. Martin Co., warned airframe manufacturers not to dissipate their avionic engineering talent in developing equipment but to assign them to weapon system management.

He also told avionics companies they should be willing to accept small development contracts, gambling with aircraft builders that a prototype will result in quantity production.

But W. R. Persons, president of Emerson Electric Manufacturing Co., said the cost of making weapon system proposals grows to as much as $50,000.

Therefore, it appears only fair, said Persons, that a prospective subcontractor should know from the start whether he will be bidding against the prime's own avionic group.

▶**USAF Policy**—Brig. Gen. C. H. Mitchell, director of procurement and production for Air Materiel Command's headquarters at Wright-Patterson AFB, indicated the Air Force is against encroachment by aircraft companies.

"There must be some compelling reason for an airframe manufacturer to build his own component equipment," he said. "This should happen only by default of the electronics industry.

"However, it is not the policy of the Air Force to encourage or condone airframe manufacturers from entering the electronics business—or the same policy in reverse."

▶**Team Discipline**—Sperry Gyroscope Co.'s Norman L. Winter said: "The electronics industry can serve the weapon system concept in all facets.

"We recognize the need for team discipline. Someone should have the responsibility and authority and the communications to carry out a program. There is no standard answer to all weapon systems problems.

He said each program should have its parameters laid out and then it should be examined to see whether an airframe or avionics firm would make the better manager.

▶**'Only Solution'**—Esenwein reported that of 1,320 engineers working on Convair's B-58 Hustler at Fort Worth, only 239 are electronics engineers.

"In developing the B-58 weapons system, we are continually confronted by the vastness of the undertaking," he said. "Only one solution to getting the job done is possible: extensive subcontracting.

"Never has our problem been one of too little work, work to be husbanded selfishly in our own plant. Rather, the greatest problem has been one of finding capable, qualified, enthusiastic and uncommitted vendors. Our sister divisions at San Diego and Pomona have had the same trouble on other programs—which is why, in certain instances, they have had to do some of the electronics work themselves."

▶**False Alarm**—In addition to fear of encroachment, avionics companies are alarmed over two other implications of the weapon systems concept, said Esenwein. These other fears are:

- **Severence** of direct contact between prime and subcontractors.

"In my experience for the last two and a half years under the B-58 weapons systems program, the exact opposite has occurred. The coordination that has emerged and the integration that has been possible, both technically and administratively, have been of the highest degree.

"From the outset, regular and frequent meetings and reviews yielding timely resolutions of differences have been the key. . . . We seem, because of the greater interdependence of effort enforced by the weapon systems concept as well as the complexity of the system in question, to be preventing fires rather than putting them out."

- **Stagnation** of research and state of the art advancements because of elimination of generalized programs.

"Historically, technological improvements in the applicatory sense seem to come from having to deal with specific problems. The need for a particular item creates the demand for solution. It would seem that requirements for new, novel and improved items are continually pulling at the state of the art, rather than vice versa. . . .

"The electronics industry should not become alarmed if it is unable to secure as many programs for developing items and subsystems applicable across the board. . . ."

Offset Principle

Subsidy to Pan American-World Airways on Fiscal 1954 and Fiscal 1955 operations should be reduced by approximately $5.2 million by application of the so-called "offset principle," according to Civil Aeronautics Board's staff.

Under this principle, based on a Supreme Court decision, excess earnings of one segment of an airline's operation are applied to subsidy requirements of other segments.

The staff maintains that for the last nine months of Fiscal 1954 (from Oct. 1, 1953 to July 1, 1954) there will be over $3.1 million in PAA earnings to apply against subsidy, and for the full Fiscal 1955 there will be $2.1 million. All recaptures prior to Oct. 1, 1953, when the order separating mail pay from subsidy was issued, go to Post Office, instead of CAB.

The Fiscal 1954 and Fiscal 1955 operations of only two other carriers will be affected by application of offset, according to CAB's staff: Delta-Chicago and Southern Air Lines, $1.1 million; Branniff Airways, $91,000.

Aviation Obligations

Obligations of the Air Force and Navy for aircraft and related procurement are on the upswing, with new orders increasing and cancellations decreasing.

Net obligations for the first three quarters of Fiscal 1955 of $4.2 billion compared with only $807 million for the same period of Fiscal 1954.

The sharp increase was with USAF from $395 million for the 1954 period to $3.6 billion for the 1955 period. Navy's obligation of $649 million for the 1955 period compared with $412 million for the 1954 period.

The prospect, though, is that both services will wind up the fiscal year in July with substantially greater carryovers into Fiscal 1956 than estimated. As of Apr. 1, the total unobligated balance on hand for new procurement orders was $5.3 billion. This was divided: USAF, $5.9 billion; Navy, $2.4 billion.

Expenditures for aircraft and related procurement, reflecting production, are inclined downward, according to Defense Department figures.

USAF and Navy spending averaged $727 million monthly during the first three quarters of Fiscal 1955, compared with an average of $775 million during Fiscal 1954.

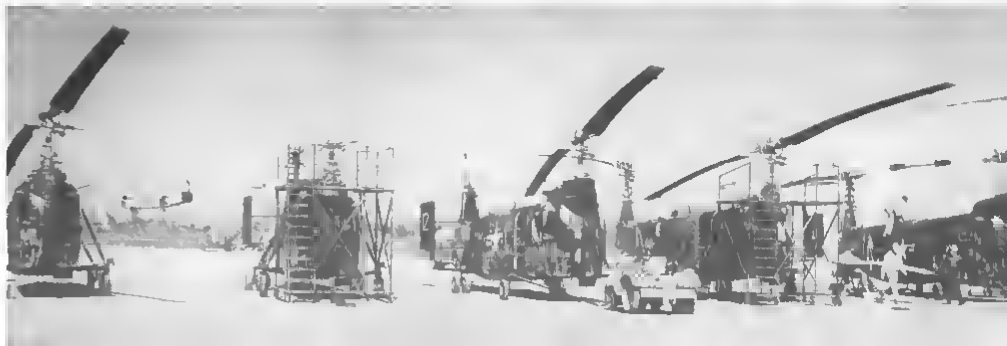
The unexpended balance on hand for payments was over $20.4 billion, as of Apr. 1. This was divided: USAF $13.5 billion, Navy, $6.9 billion.

TANDEM-ROTOR BELL HSL-1 prepares to take off from the USS Kula Gulf during the anti-sub copter's shakedown cruise.

HSL-1 Starts Fleet Trials On Carrier

BIG HSL-1 squeezes onto the Kula Gulf's elevator, with 51 ft. rotors folded, as copter is brought up from the hangar deck to start sub hunt. Three HSL-1s provided 100% availability during the eight-day maneuvers.

BATCH of new HSL-1s gets finishing touches before delivery to the Naval Air Training Center at Patuxent River, Md., where the helicopters are undergoing advanced trials.



Curtiss-Wright Net Climbs 100%; Hurley Renews Equipment Appeal

Profits of Curtiss Wright Corp are beginning to reach "the desirable rate" of 5½% on sales, after taxes But this isn't excessive, said Roy T Hurley, company president, in an appeal for more lenient consideration of aircraft profits and depreciation allowances

Announcing a consolidated net profit of $6,820,707 for the first three months of 1955 (double last year's first quarter net of $3,193,842) on sales of $123, 496,571, Hurley last week claimed the aircraft industry needed such a ratio He said it was less than manufacturing and automobile company averages

Commercial business accounted for 40% of the first quarter profit, Hurley announced Unfilled orders and scheduled production under advance contracts for the company and its subsidiaries totaled $860 million on Mar 31, approximately the same as last year

► **Re-equipment Program**—In a full dress presentation of a proposal he has been making to the aircraft industry for over a year,—"with mixed success," Hurley outlined a $70 million five year re-equipment program for his company tied to a five-year depreciation allowance and company sharing of cost reductions to the government

With the new equipment, mainly machine tools, Hurley said Curtiss-Wright can reduce production costs by 30% On Air Force business for which the company would receive $400 million, production costs now run $360 million This could be cut by $108 million to $252 million

The company could undertake the re-equipment on its own, but its allowable gross, pre-tax profit, figured at 11 1%, would drop from $40 million to $28 8 million Hurley suggested that his stockholders wouldn't tolerate this

► **$80 9-Million Savings**—His alternate proposal is for the government to allow the company to keep 25% of the savings from cost reduction and to depreciate the new equipment over five years Under this scheme, government payments to Curtiss-Wright would drop to $319 1 million, saving $80 9 million for the government Company profits before taxes would be $53 1 million, an increase of $13 1 million

In addition to government savings and the increased company profits, Hurley claimed the plan would eliminate the investment which the government has had to make in his and other aircraft companies At the end of the five years, Curtiss-Wright would own all of its facilities and equipment and would depend on the government only for wind tunnel and similar facilities

"If the re equipment is not handled in some way, costs of producing equipment for the Air Force will rise," he said "Also, the industry will not be ready to meet accelerated demands if war should break out"

Lack of industry support for his proposal, he blamed upon the "erroneous view" that the aircraft industry would always be a ' peak and valley" business

► **Expansion, Dispersal**—Hurley also announced three land purchases being made by the company

- In central Pennsylvania, almost midway amongst Emporium, St Marys, Phillipsburg and Clearfield, a tract of about 52,000 acres where jet testing and research facilities will be located
- Somewhere between the Sierras and the Rockies, an area of 100,000 acres for future development
- In northwest New Jersey, west of Suffern, for executive headquarters and vault storage of design plans—as a safe guard against atomic attack

The movement of executive headquarters from Wood-Ridge, N. J., does not mean a cutback there. The Wright Engine Division activities have grown so that there isn't room any longer for executive headquarters at that location, Hurley said

Industry Must Help Improve Field Servicing, Defense Official Says

Aircraft and electronics industries must assume greater responsibility for maintenance of their products in the field and maintenance must be made cheaper and easier, a Defense Department official declared last week

The declared policy of giving initial production contracts to the firms which develop weapon systems designs is intended to improve reliability as well as facilitate production, the American Ordnance Assn was told at a San Francisco meeting by William H Martin, Deputy Assistant Secretary of Defense for Applications Engineering

In order to meet this challenge, Martin said it is up to the contractors to make sure their development engineers and designers have these things

- Knowledge of the conditions to which the equipment is subjected in the field, in distribution and storage
- Early knowledge of all failures in evaluation tests and the conditions under which they took place
- Information on how the product behaves under service conditions
- Analysis of all malfunctions and troubles to determine causes

Martin said his office, headed by Frank D Newbury, has an Office of Maintenance Engineering for the seeking of better maintenance methods

The reason The cost of maintaining electronic equipment in the Air Force is twice as much a year as the initial cost of the equipment Navy estimates maintenance during life of the equipment costs 10 times as much as the original item

"We cannot keep on adding more complex weapons to our arsenal" Martin declared, "unless we lick these problems. . . . The industry of this country must take leadership . . ."

". . . There can be and must be a better balance than we now have between production results and service results Industry can and should take a part in this and conditions should be suitable for participation

This means also that some industrial organizations may need to recognize that their responsibilities go beyond what has seemed to them to be the limits of their own direct interests '

Martin expanded to some extent on the declared effort of Newbury's office to seek new economies in the development field One example of this was a program to enforce standardization of jet engine sizes and thrusts

Martin said it is good to have several approaches to a new weapon so that every research possibility can be explored by industry, the universities and the military However he said the multiple approach should not be used "in design-development activity where the objective is a specific equipment or system."

► **Single Approach**—In this field, Martin said, "We want to narrow down to a single approach if possible, the selection of which must be the responsibility of the military but the implementation of which is generally the responsibility of industry"

There is a strong tendency for the multiple approaches—which are desirable in the exploratory phase—to persist as multiple projects in the design development phase and then as multiple items in production and use

"It is generally not expensive to have multiple approaches in the exploratory work In the design-development phase, however, costs rise rapidly because hardware is being built and many models are needed for the searching engineering and operational suitability tests"

Airline Group Studies No-Show Problems

A number of plans designed to correct abuses of airlines reservations systems and relieve the no-show problem have been referred to a special committee by the Air Traffic Conference

The action was taken at the Spring meeting of ATC when four airlines suggested various solutions to the cancellation and no-show problems The seven man special group will review the plans and report its recommendations within 60 days

The matter will be taken up by ATC on Aug 11 at a special meeting scheduled for Chicago

The conference also decided to set up an office of enforcement to back up ATC resolutions. This action is subject to the approval of the board of directors of Air Transport Assn

The plans submitted by the four airlines

- **American Airlines** would extend the no show penalty now used on coach service to first class flights (AW May 2, p 98)
- **United Air Lines** advocates an incentive system and would credit a passenger $3 for a ticket coupon, providing the ticket was purchased and reservations made at least two days before the flight and the ticket was used as booked. United suggests $3 and $5 charges on refunds for unused flight tickets
- **National Airlines** suggests a dual ticket system whereby a passenger would buy a basic trip ticket and a reservation ticket The trip ticket would be refunded, but the reservation charge would not Less than three hours before flight time, a passenger could buy a ticket at the airport ticket counter without paying the reservation ticket charge
- **Western Air Lines** plan would require a passenger who makes reservations more than a week before flight time to pick up his ticket seven days before flight date or be cancelled A change or cancellation between seven and three days before the flight would cost the customer a 5% charge A cancellation less than three days in advance of the trip, or a no-show, would cost the price of the first leg of the trip

Western would require that passengers making reservations less than a week before the trip pick up the ticket the same day or else be cancelled

Those reserving space the day of the flight would have to pick up the ticket within two hours

WADC Seeks Bidders For Local Purchases

Wright Air Development Center is establishing a Bidder's Mailing List of Suppliers considered qualified to bid or negotiate on local-purchase requirements of the various WADC laboratories at Wright-Patterson AFB, Dayton

Materials normally procured by the base's local purchase branch are standard commercial items not listed on USAF stock lists

Typical of these items are meters and gages of various sorts, some types of avionic equipment, aeromedical equipment and supplies, various types of test equipment pumps and parachute assemblies The complete list is available from WADC's local Purchase Branch

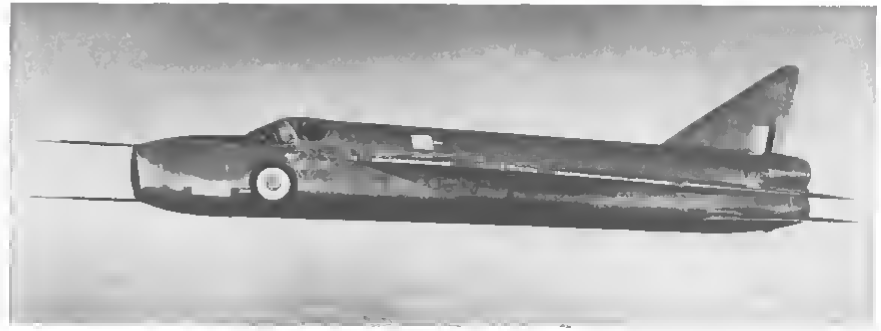
Contractors who wish to be placed on the mailing list must fill out form SF 129, Bidder's Mailing List Application, and send it to Local Purchase, indicating the various items they are interested in selling to WADC laboratories

The form must be submitted by all contractors who wish to be queried on quotations even if they have formerly done business with the branch Brochures, catalogs and literature on applicable items should be forwarded at the same time

Contractors on Federal Supply Schedules of the General Services Administration should send price lists, catalogs and contract numbers for items on which they desire to submit quotations

Airport Aid Cut

Increased appropriations for the Federal Air Airport Program in Fiscal 1956 have been promised by House Appropriations Committee members, who object to the $11 million requested in CAA's budget as piddling CAA Administrator Fred Lee told the committee he knew of no specific reasons for the reduced amount. The original request submitted to the Secretary of Commerce was for $41 5 million for grants in-aid for airports Lee said. The Department cut $10 million and sent a request for $31 million to the Bureau of the Budget which has further pared it down to the $11 million finally forwarded to Congress.



P-1 Shows Over-and-Under Configuration

English Electric's P 1 longrange supersonic interceptor, designed to strike enemy aircraft over their home territory, sits for its first air-to-air portrait. The side view of the new prototype shows the over-and under configuration of the dual Armstrong Siddeley Sapphire powerplants without afterburners, that have boosted the P 1 to supersonic speeds on most of its 100-plus test flights beginning last August Test flying is shared jointly by R P Beamont, the company's manager of flight operations, and Peter Hillwood.

Conversion Dampens AMC Hope To Sell C-82s; Plan New Offerings

By Claude O. Witze

Wright-Patterson AFB, Ohio—Air Materiel Command has more than 400 used aircraft lined up for sale and will open a new set of bids—on 93 surplus C-82 transports—at Kelly AFB in Texas, June 3.

This is USAF's second effort to get the stock moving by disposing of the Flying Boxcars. First set of offers was opened on March 30 but they resulted in so many contingency bids that the only solution was to scrap the whole effort and start again.

According to Col. J. M. McCampbell, chief of the Property Disposal Division of AMC's Directorate of Supply, the initial effort gave bidders too much leeway to be selective in naming their preferences. Result was that the better planes were chosen in groups with more than one choice by many bidders. All the offers were thrown out, Col. McCampbell says, to protect the government and prospective customers.

▶ **Second Sale Likely**—In the new offer, dated May 4, bidders are required to name one price for any selected aircraft identified by serial number. No contingency bids will be allowed and no single bid will be accepted for more than one aircraft. Separate offers must be made for each one.

AMC's Property Disposal Division expects not all of the 93 aircraft will be sold and that a new sale will be needed. The planes will go without spares, sold as is and on the spot. They can be seen at Kelly AFB and Hill AFB, Ogden, Utah.

Col. McCampbell says the aborted sale of March 30 resulted in substantial interest, particularly from would-be purchasers in Cuba and Mexico.

In addition to the C-82s, Col. McCampbell told AVIATION WEEK, he expects upcoming sales of surplus aircraft will seek disposal of:

- Nineteen Northrup YC-125 Raiders. Bids will be invited in about 30 days. The aircraft are powered by three Wright R1820 engines. Can be seen at Sheppard AFB, Wichita Falls, Texas.
- Forty-two Beech T-7 and 137 T-11 trainers. Located at Hill AFB, Ogden, Utah.
- One hundred and twenty-nine Beech C-45 transports. This is a five-passenger plane, powered by two Pratt & Whitney R985 engines. Also located at Hill AFB.

Col. McCampbell said sale of the trainers and C-45s will be held only after a report from the Commerce Department on possible impact of the sale on the aircraft industry. Study is routine before disposal of property with acquisition cost of $250,000 or more.

Before any sales are held, second routine procedure is to offer the material to other government agencies. Aircraft sometimes are passed along in this manner. Recently two C-45 transports were given to the U. S. Forest Service and one to the National Advisory Committee for Aeronautics. Two of the Northrop tri-motor planes have been taken by the Department of Health, Education and Welfare.

Before the March bidding on the 93 C-82 Flying Boxcars, USAF officials had admitted some pessimism over the prospects.

▶ **Conversion Cost High**—Major problem concerning disposal of the C-82s to private buyers is an apparent prohibitive expense involved to modify the planes to meet civil air requirements. Two years ago, Fairchild Engine and Airplane Corp., which built 220 C-82s as a forerunner to the C-119, investigated the question of civil conversion.

Fairchild's report was to the effect that CAA standards could be met but cost probably would be prohibitive.

In mid-March a joint Air Force-Civil Aeronautics Board statement was issued which amounted to a "buyer beware" warning. Prospective purchasers of the C-82 were reminded that the aircraft does not meet civil air requirements and the modifications necessary to permit certification would be extremely difficult and costly. The Board independently stressed that there was no intention to waive any of the transport category requirements for the C-82. Interested buyers were advised to consult with CAA as to plans for qualifying the aircraft for civilian use prior to making any commitment.

▶ **More Power Needed**—CAA engineering chief W. H. Weeks told AVIATION WEEK: "We don't know the extent of modifications that would be required to permit certification of the C-82. Packet for economical civilian use."

CAA has not received any applications for civil certification of the military transport, he said, and added that the applicant would have to first present his substantiating data and plans before flight tests will be considered. Weeks said the plane would probably need more horsepower because military gross weights ordinarily cannot qualify for civil certificates. One problem, he said, would be CAA rule for single engine performance and weight factor.

Efforts have been made to compare the situation with that encountered in the civil use of the C-46. Industry experts contend, however, it is a totally different problem. The difficulties encountered with the C-46 are believed resolved and at a much more modest figure than is forecast for the C-82.

▶ **C-46 Program**—The Air Force backed into the sale of the last batch of C-46s after a nine-year leasing period. As many as 106 C-46s were leased at one time to commercial operators. USAF offered them for sale last summer. An initial lot of 53 C-46s were disposed of in January and the balance will be sold in the near future. The price varied between $50,000 and $75,000 per plane depending on allowances for the number of hours on engines and airframe. Civil operators of the C-46 had their problems with CAB while they were operated under lease. The Board successively reduced the gross weight limitations aimed at bringing the aircraft within transport category requirements and continued to grant waivers as modification experiments progressed.

B-26 Spares

Wright-Patterson AFB—For the first time since 1948, spare parts are available to keep privately-owned B-26 aircraft in flying condition.

Air Materiel Command is ready to accept bids on spare parts through the National Bidders Control Branch Building 140, Attention SASPC, Kelly AFB, Texas.

B-26 planes bought after World War II for commercial use have been getting along since 1948 without USAF spares, sale of which was stopped in that year.

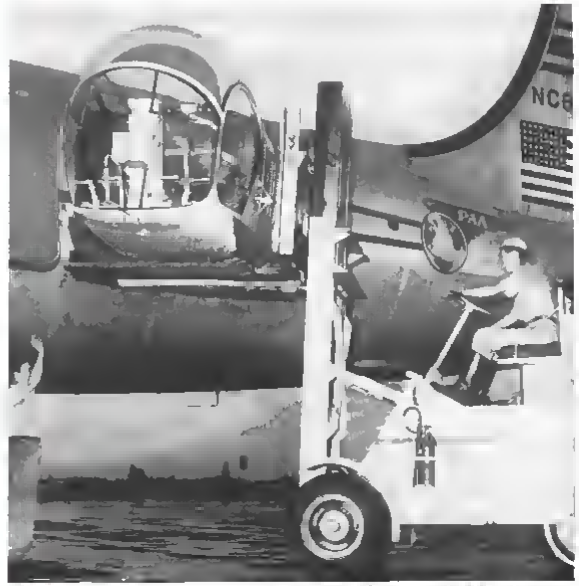
AMC doesn't know how many of the aircraft still are in use, but some demand for the parts is expected.

AA to Equip DC-7s With C-Band Radar

American Airlines will start installation of C-band radar in its DC-7 fleet next fall.

American has signed a contract with Radio Corporation of America for in-flight weather surveillance equipment for its current fleet of 25 DC-7s. Installation will start in October, and will be continued on 14 DC-7s scheduled for early 1956 delivery. The whole program will cost about $800,000.

The carrier is installing the radar on its DC-7 aircraft first since its use on long-haul will furnish "practical operational experience over a wide area of the country, so that we can properly evaluate the effectiveness of this type of radar," according to O. M. Mosier, Senior Vice President-Operations.



HITCH-HIKING COPTER is loaded aboard PAA DC-4 freighter for Miami-Sao Paulo flight.

PanAm Plans to Convert DC-6Bs To Freighters for Cargo Boom

By Gordon Conley

Pan American World Airways is preparing to convert some of its DC-6Bs to DC-6A airfreighters as new Douglas DC-7Bs and DC-7Cs free the older transports from passenger routes. With more all-cargo planes, officials believe the airline can push its total airlift past the 80 million lb. forecast by PAA for 1955.

"We need more freighters," says Ed Hudak, U. S. cargo sales manager. "We're getting more cargo than we can handle—especially on North Atlantic routes. And we haven't even started to scratch the surface of this market."

Pan American has 45 DC-6Bs to draw on for conversion to DC-6A configuration as its seven DC-7Bs and 33 DC-7Cs are delivered in 1955-56 (AW May 2, p. 86). PAA will get its first DC-7B late this month, and DC-7C deliveries will start next year.

The airline's present all-cargo fleet now consists of three DC-6As and 11 DC-4s. Nineteen passenger DC-4s equipped with foldup seats on runners are available for quick conversion to freighters.

More than 60% of PAA's air cargo business now is lifted on combination freight/passenger transports because of the better service and frequency possible with this larger fleet.

▶**Cargo Growth**—Pan American believes the largest growth this year will come from North Atlantic shipments. Willis G. Lipscomb, vice president-traffic and sales, forecasts a gain of at least 50% over the 13.7 million lb. carried by the Atlantic Division in 1954.

INDIA ELEPHANT gets special handling.

Smaller increases are expected from the airline's three other divisions. Their cargo records last year: Latin America, 46.1 million lb.; Pacific, 4.4 million lb.; and Alaska, 6 million lb.

▶**20% Reduction**—Lipscomb bases his North Atlantic prediction on low rates adopted by the International Air Transport Assn. last March and scheduled to become effective July 1. This new structure will reduce rates 20% on up to 75% of North Atlantic air cargo, cutting the average from 32 cents a ton-mile to 26 cents.

Air cargo shipments between the U. S. and Europe have started to climb under the present rate structure, increasing 20% during the first quarter of this year over the same 1954 period.

To meet this normal gain plus sharper ones expected after July 1, Pan American plans to increase its all-cargo flights on the North Atlantic from three to six round trips a week.

▶**Future Cuts?**—The new North Atlantic rate, first proposed by PAA, apparently is the first step in an PanAm program to reduce tariffs to the minimum possible to make a profit.

"We've got to keep pulling the rates down," says Cargo Sales Manager Hudak. "It's better to have a smaller profit and a larger volume. But the European airlines want to keep rates up to what the traffic will bear. We had stiff opposition from them in IATA on the new rate."

▶**Turboprop Freighters**—Hudak believes international air cargo rates eventually should be reduced to 8 or 9 cents a ton-mile. He says this would be possible with one of the new turboprop powered military freighters, the Lockheed C-130A or the Douglas C-132.

Pan American has started preliminary negotiations with USAF to lease C-130As, Hudak reports, and is talking with airframe builders on what it wants in a commercial all-cargo transport.

▶**Best Market**—Bulk of Pan American's cargo now moves to Latin America, where airlines hold the upper hand over surface carriers. Railroads have only 85,207 miles of track in the entire

CARGO DRUMS go into Stratocruiser hold.

Latin America area, compared with 227,224 miles in the United States. Highway facilities are, to a large degree, underdeveloped.

"Dealers in South America also have realized that if they bring in a large volume of merchandise by ship, it's all going to waste if they've made a wrong guess on what will sell," Hudak says. "Airfreight eliminates this chance and gives them a larger variety with smaller inventories."

In addition, PAA reports it often underbids surface carriers on shipments to Latin America. The division's rates, 25-30 cents a ton mile, are the airline's lowest.

Japan Airpower Coming Back

Japan is slowly getting back into the air.

Last month the Rising Sun insignia appeared on military jet aircraft for the first time.

Three Japanese pilots are presently checked out in and flying F-86s. Others are taking flight instruction on Lockheed T-33s, being checked out on Curtiss C-46 transports, Grumman TBMs and Lockheed P2Vs.

Japan Air Lines finished its first year of international operations and its third of domestic service. Two Japanese became captain pilots on the line's domestic runs. Expansion of JAL's services in Southeast Asia was being pushed under pressure from the government.

JAL has decided to order two Douglas DC-7Cs. Placing of the new order is dependent upon government approval.

Aircraft companies were overhauling airframes and engines, both jet and piston powered, for the U. S. Far East Air Force.

Some aircraft assembly contracts were underway for light planes and helicopters. But the industry was marking time pending U. S. and Japanese government decisions on how to finance aviation purchases for the Air, Maritime and Ground Staff Offices of Japan's National Defense Agency.

After many months of tortuous negotiations, during which the Japanese attempted to maneuver the U. S. into agreeing to foot the total bill for the air buildup, agreement is about to be announced on a production plan. The U. S. will buy aircraft to be assembled or built in Japan by Japanese manufacturers.

The Japanese government will now appropriate funds for purchasing production equipment and building new plants.

Initial Japanese plans call for about 100 each of North American F-86s and Lockheed T-33s to be purchased knocked-down for assembly in Japan. The F-86s will come first, according to Japanese industry sources who feel that Mitsubishi Heavy Industries Co. should have a head start on Kawasaki Aircraft Co.

Mitsubishi has license agreements with North American, and Kawasaki is tied up with Lockheed.

► **Political Contracts**—In addition to asking the U. S. to foot the major share of the bill, the Japanese authorities want sole power of determining who will build what in Japan. U. S. officials—knowing of political ties that would throw most of the aircraft business to certain traditional firms, regardless of competence—have insisted that as long as the U. S. is paying, it should have some say.

One notable case came up last year, when the U. S. Far East Air Logistic Force awarded a jet engine overhaul contract to Kawasaki Aircraft Co., rather than to a company recommended by a Japanese advisory committee. FEALOG FOR and FEAF said they selected the company best prepared to undertake the contract and with readily available technical assistance from the U. S. FEAF wanted performance right away and did not want to wait while a

designated company made its arrangements

Kawasaki had made its technical assistance contract with Lockheed Aircraft Service Overseas Corp., which demonstrated to FEAF that it could provide complete technical assistance. All other companies still were negotiating.

▶**Head Start**—The importance of the Kawasaki contract is the head start it gives this company in the jet engine business. In addition to overhauling engines for all USAF units in the Far East, the company may receive contracts for jet overhaul from Asian air forces supplied with U. S. equipment—such as the Chinese Nationalists on Formosa.

The next logical step would be assembly of jet engines for Japanese-made aircraft. Kawasaki should have the advanced know-how to win it these contracts, and later to begin manufacture in Japan.

Admittedly, both engine assembly and manufacture are a long way off. The industry knows that Japan does not have the quality of materials to merit undertaking such manufacture. Nor does the potential volume of business promise to make production economical.

▶**Japanese Pressure**—FEAF has stuck by the decision giving Kawasaki the overhaul business.

But the Japanese Ministry of International Trade and Industry wants future production concentrated solely in the Japan Jet Engine Co., jointly owned by Shin Mitsubishi Heavy Industry Co., Fuji Heavy Industry Co. and Ishikawajima Heavy Industry Co., and set up under a special Diet law.

To further its aims, MITI administratively discriminates against Kawasaki by curtailing allocations to it of government funds and has been trying to force acceptance of another Japanese company upon FEAF for part of the jet engine overhaul.

Fuji Heavy Industry Co., formerly Nakajima Aircraft Co., imported 70 Beech T-34s. Twenty were completed, and 50 knocked down for assembly in Japan. All are for the National Defense Agency. An additional 30 are scheduled for assembly later in the year. Fuji also is seeking other markets for the Mentor in Southeast Asia.

Main future interest for Fuji is guided missiles. It hopes to obtain technical assistance from an American missile maker. Efforts so far have been disappointing because of U. S. security restrictions.

▶**U. S.-Furnished Airpower**—From the U. S., the Japanese have received 63 T6Gs, six T-33s, 16 C-46s, for the Air Staff, 12 SNJs, 10 TBMs, 17 P2Vs for the Maritime Staff, and more than 100 L-5s, L-19s and L-21s, six H-13s and five H-19s for the Ground Staff. Additional P2Vs are scheduled for delivery later in the year. The P2Vs are specified for training purposes only.

More T-33s will be made available as more officers complete basic flight training, and move on the for transition into fighter units.

The U. S. also will turn over enough F-86s to equip one squadron before the end of the year.

Original planning of the air staff called for the North American T-28. This was washed out recently in an economy move.

▶**Kawanishi Comeback**—Shin Meiwa Industries Co., formerly Kawanishi Aircraft Co., is the only member of Japan's Big Four has had a hard time getting back into the aircraft business.

Formerly a manufacturer of aircraft for the Japaneses Imperial Navy, the company now hopes to reenter the sea plane business with technical assistance from an American manufacturer.

Feelers have been extended to get Shin Meiwa a contract for overhaul of Republic F-84s still based with FEAF in Japan.

▶**JAL's First Year**—Japan Air Lines reports a successful first year in international service.

On combined international and domestic (Tokyo-Honolulu-San Francisco and Tokyo-Okinawa), JAL broke even on revenue and direct expenses. The airline is in the red because of the high cost of hiring and keeping American pilots, the high cost of maintenance and the heavy interest it must pay on equipment loans.

The new government installed last month is reinforcing JAL's capital with one billion yen (about $3,000,000). It also promises a loan of ¥500,000,000, and an annual direct subsidy of ¥350,000,000 (nearly $1,000,000). Another assist is reduction of the transportation tax on air travel from 20 to 10%. This enables JAL to increase tariffs without making an increase in fares.

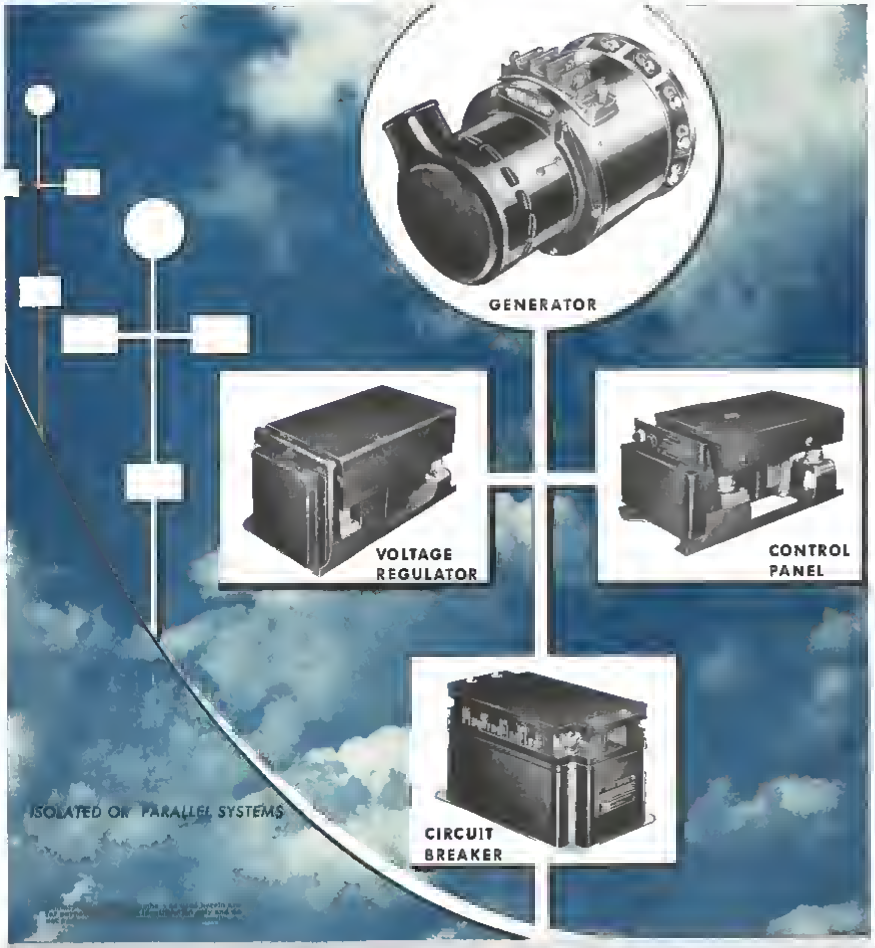
Substitution of Douglas DC-7Cs for de Havilland Comets has been decided upon by the company board even if this means forfeiture of one-half the down-payment of $1,000,000 made on Comets last year.

▶**Future Outlook**—Plans to expand service to Brazil ARP postponed in favor of extensions to Bangkok and Rangoon.

The government believes it would be more profitable and in keeping with Japanese economic interests to develop this regional traffic.

Eventually, Japan Air Lines will need replacements for its DC-4s on domestic service. They are attracted by the Vickers Viscount and will keep a close watch on Capital Air Lines' experience. Another prospect is the Convair

A-C SYSTEMS FOR AIRCRAFT



JACK & HEINTZ *Rotomotive*

...a report from JACK & HEINTZ

Wide range of a-c systems... result of expanded J&H Generator line

Jack & Heintz now offers the aircraft industry complete alternating-current systems and components "tailored" to meet the demands of tomorrow's high-performance aircraft.

With the expansion of its a-c generator line and extensive experience in the development and production of a-c control panels, regulators and other auxiliary components, J&H can now supply a-c systems ranging from 3 through 120 kva. These systems are capable of isolated or parallel operation.

MAJOR SYSTEM COMPONENTS

GENERATORS: Designed to meet MIL-G-6099 and applicable drawings, J&H a-c Generators are among the smallest and lightest yet developed. Available models include cooling by blast air, oil or vapor.

Important features include:

Light weight* • High efficiency*
Low harmonic content* • Phase balance*
Class "C" thermal (120° C) performance

*Better than required by MIL-G 6099 and applicable drawings.

CONTROL PANELS: Designed to meet applicable USAF and Navy specifications, J&H Panels can also be built to special requirements. They can operate either from the d-c bus or independent of it.

J&H Panels include any or all of the following functions (which can be supplied as individual components, if desired)

Generator control relay • Overvoltage protection† Undervoltage protection • Phase sequence protection † Under-speed or under frequency protection Anti-cycling • Power indication • Field flashing Special interlocking

†Overvoltage relay is insensitive to acceleration forces.

VOLTAGE REGULATORS: Designed to meet MIL-G-6099 and applicable drawings, J&H Regulators are of the static-magnetic-amplifier type. Weighing as low as 11 pounds, the regulators feature a magnetic reference eliminating the use of electronic tubes. Provision is made in all regulators for reactive load division function. Either average or high-phase sensing is available.

CIRCUIT BREAKERS: Typical of the units in this group is J&H Model 50086 circuit breaker, designed to meet MIL-C-6379A (ASG) and rated at 175 amperes. It has the following outstanding features.

Weight—4¾ lbs
Phase barriers throughout
Balanced rotary latch
Direct solenoid actuated contacts
Noncritical adjustment of interlock contacts
Easy inspection of main contacts

OTHER COMPONENTS: In addition to the panel functions which can be supplied as individual components, Jack & Heintz has developed transformers, reverse power relays, phase sequence relays and other auxiliary a-c system components.

Jack & Heintz has complete facilities for design, development and testing of your special aircraft accessories or systems—plus production for limited or full-scale runs. We invite your inquiry. Write Jack & Heintz, Inc., 17635 Broadway, Cleveland 1, Ohio. Export Department: 13 East 40th Street, New York 16, N. Y.

ELECTRICAL and MECHANICAL ENGINEERS: There's a promising future for you at Jack & Heintz. Engineering and research laboratories located in suburban Cleveland close to good residential areas. Many benefits include insurance, hospitalization, medical care and liberal vacation policy. Write Manager of Technical and Professional Placement today for illustrated, descriptive booklet.

AIRCRAFT EQUIPMENT

AVIATION CALENDAR

May 16—National Fire Protection Assn annual aviation seminar. Netherland Plaza Hotel, Cincinnati.

May 16-20—National Materials Handling Exposition, produced by Clapp & Poliak. International Amphitheater, Chicago.

May 18-19—Air Navigation Development Board, technical symposium on the common system radar beacon, Washington, D. C.

May 18-20—National Telemetering Conference. Morrison Hotel, Chicago.

May 19—Royal Aeronautical Society. 43rd Wilbur Wright Memorial Lecture, Royal Institution, London. Lecturer: Dr. C. S. Draper, head of the Department of Aeronautical Engineering at Massachusetts Institute of Technology.

May 19-21—Armed Forces Communications Assn., global communications conference. Commodore Hotel, New York.

May 23—Daniel Guggenheim Medal Board of Award, annual meeting, University Club, New York.

May 23-24—American Society for Quality Control, ninth annual convention, Hotels Statler and New Yorker, New York.

May 28-30—Eastern States Soaring Assn., championship contest, Wurtsboro, N. Y.

May 30—Federation Aeronautique Internationale and KNVvL Royal Netherlands Aeroclub, fifth International Air Display, Ypenburg Aerodrome, The Hague.

May 30-June 4—Aviation Writers Assn., 1955 annual convention, King Edward Hotel, Toronto.

May 31-June 3—Design Engineering Show, produced by Clapp & Poliak, Inc., Convention Hall, Philadelphia.

June 4—Reading Aviation Service, sixth annual Maintenance and Operations Meeting, Reading, Pa.

June 4-5—Canada's National Air Show, Toronto.

June 8-10—American Welding Society, third annual Welding Show. Municipal Auditorium, Kansas City, Mo.

June 9-14—Sixth All-Women's International Air Race. Washington, D. C., to Havana, Cuba.

June 10-19—Twenty first International Aviation Display. LeBourget Field, Paris, France.

June 12-17—Society of Automotive Engineers, Golden Anniversary meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 12-19—Pennsylvania Pilots Council Pilots Proficiency Contest, Graham Field, Butler, Pa.

June 13-14—Women's Aeronautical Assn. annual Skylader Derby. Little Rock, Ark., to Raton, N. M.

June 18-25—Philadelphia Junior Chamber of Commerce third annual Transcontinental Air Cruise. Palm Springs, Calif. to Philadelphia.

June 20-23—Institute of the Aeronautical Sciences and the Royal Aeronautical Society of Great Britain, fifth International Aeronautical Conference, IAS Building, Los Angeles.

June 20-25—Symposium on Electromagnetic Wave Theory, University of Michigan, Ann Arbor, Mich.

June 20-July 1—Special short course on Parachute Technology, Massachusetts Institute of Technology, Cambridge.

Indicator Pinpoints Engine Temperature

By Philip J. Klass

The simple thermocouple-galvanometer combination, long used in aircraft to measure and indicate engine temperature, faces tough competition from new super-accurate self-balling type systems. The need for high accuracy stems from the critical effect of exhaust and turbine inlet temperatures on the performance and life of turbojet and turboprop engines.

One of the new temperature indicators, developed by Avien under Wright Air Development Center sponsorship, provides:

- **Accurate measurement** of temperature with a sensitivity of 1 deg. C and a maximum error of 5% full scale. (This corresponds to 5C for normal turbojet temperature ranges.)
- **Expanded scale indication,** with a large pointer that swings over a 288-deg. arc and a smaller vernier sub-dial which makes one complete revolution per 10C. This makes it possible to read the indicator easily to within 2 C.
- **Stability over a wide range** of operating conditions for 1,000 hr. without need for recalibration, according to Avien.

The new Avien system, consisting of a thermocouple, amplifier, and small (2-in.) panel indicator, weighs 3½ lb. Minneapolis Honeywell has a similar temperature indicating system, which also weighs 3½ lb., and is reported to have comparable accuracy to the Avien. General Electric is developing a similar system.

Avien's unit is installed on Lockheed's new C-130A, R7V-2, and will go into Northrop's new F-89H and a new Martin airplane.

Old Versus New

In the older thermocouple-galvanometer type indicator, the thermocouple develops a voltage whose magnitude is a function of the difference in temperature between its "hot junction" and its "cold junction." The hot junction is inserted into engine exhaust gas stream, for example, while the cold junction is located externally. The thermocouple signal powers a small panel-mounted galvanometer calibrated to read temperature.

With such a system, because relatively little power is developed, heavy thermocouple leads must be run to the cockpit instrument and lead resistance must be kept low to prevent serious voltage drop. The galvanometer panel indicator inherently is limited to small total pointer deflections, and the scale is non-linear because of the inherent thermocouple characteristics.

In the new indicating systems, the thermocouple voltage is balanced out in a bridge circuit by a small servo system which simultaneously positions the panel indicator pointer. Since no power is drawn from the thermocouple, lead resistance is not critical, permitting the use of lighter-gage thermocouple wire. By locating the amplifier near the engine, the length of this thermocouple wire can be reduced. This provides attractive weight saving over the thermocouple-galvanometer approach in some installations.

Conventional wires connect the amplifier to the panel indicator.

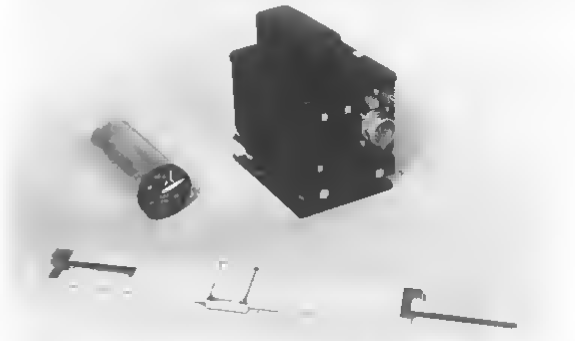
Since panel indicator power is provided by the servo motor, it is possible to greatly expand the scale and provide a linear scale throughout the range.

- **Ingenious Voltage Reference**—One of the major problems involved in designing a null-balancing type system is to find a suitable constant voltage source with which to compare the thermocouple-generated voltage.

If the overall system is to have an accuracy of 0.5%, then the d-c voltage reference must maintain its output constant to even closer limits, despite changes in airplane supply voltage, frequency, and changes in ambient temperature.

Avien has developed a novel con-

USAF LOCKHEED C-130 is among the new turboprop and jet planes getting Avien's highly accurate temperature indicator, designed to boost engine performance and life.



AVIEN SYSTEM COMPONENTS—Panel indicator and amplifier. Thermocouple is not shown.

stant-voltage reference which is small, light, and has no moving parts. It employs only three special silicon diodes and a few resistors. Despite its simplicity, Avien says the new voltage reference maintains constant output within 0.25% for ±10% variations of line voltage and frequency, over the temperature range of −60C to 70C.

Of this total, only 20% is due to voltage and frequency variations; the balance is due to temperature change.

▶ **Diode Voltage Regulator**—Avien makes use of the fact that a semi-conductor diode behaves much like a voltage regulator when in its full conducting state. When a diode and a resistor are connected in series across a voltage source, any variation of the voltage will cause a corresponding increase or decrease in voltage drop across the resistor, while the drop across the diode remains nearly constant.

What variation does occur across the diode can be effectively reduced by cascading the diode resistor circuits. Avien uses a double cascade which holds output voltage constant within 0.05% for 10% variations in line voltage, according to Harold Koletsky, project engineer.

Compensation

Unfortunately the voltage regulation characteristic of a simple diode is adversely affected by changing temperatures.

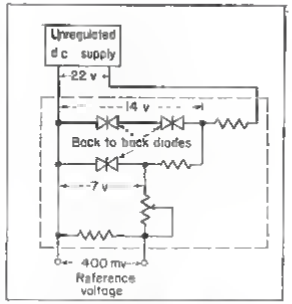
As temperature goes up, diode conductivity in the forward direction increases. Fortunately, however, the conductivity of the diode in the reverse (back) direction decreases, under the same condition. Avien came up with the idea of connecting two silicon diodes "back-to-back" to provide the needed temperature compensation.

In such a back-to-back diode, any temperature change which increases conductivity in a forward direction through one-half of the diode causes a compensating decrease in reverse direction conductivity through the second half, and vice versa.

When applied in a suitable circuit, three back-to-back diodes and their associated resistors provide a voltage regulator which is relatively insensitive to changes in temperature over a relatively wide range of values.

Although two conventional diodes could be used, Avien employs a special back-to-back diode developed for it by National Semiconductor Corp. The device resembles an ordinary junction transistor except that it has no base lead.

Avien subjects the units to 100-hour temperature cycling tests, during which their characteristics are carefully checked. In the first stage of the cascade, diodes which show a variation of ½ to 1% over the temperature range can be used. Diodes selected for the second stage must have a temperature stability of better than ¼%, Avien says.



K-VOLT STANDARD for voltage reference uses three special silicon diodes

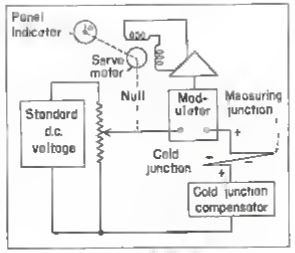
Koletsky reports that Avien has temperature cycled its voltage references for more than 1,000 hr. and that they show a stability of better than 0.1%. At the present time Avien is contemplating marketing its K-volt standard, as the voltage reference is called, for use in other control systems which need such a device.

▶ **Thermal Sink**—The K-volt standard and the thermocouples cold junction are mounted within a hermetically sealed can, filled with silicone oil, which serves as a thermal sink to isolate them from sudden changes in ambient temperature.

Long-term changes in temperature which are reflected into the thermal sink temperature, are compensated for by a pair of resistors wound over the cold junction on a single bobbin.

One of the resistors has a temperature coefficient similar to that of the standard Chromel-Alumel thermocouple used in the system.

▶ **Servo System**—The panel indicator is driven from a two-phase 400-cps motor, powered by a 2½-tube servo amplifier. (The other half of the twin triode is used as a rectifier to supply



AVIEN temperature indicating system

the K-volt standard with 22 v d c).

The d c thermocouple error signal is converted to a c by means of a chopper. Servo system sensitivity is such as to respond to thermocouple error signals as low as 40 microvolts, corresponding to a temperature change of 1C, Koletsky says. Power consumption is 0.15 amp at 115 v, 400 cps.

Avien says that amplifier and indicator are individually calibrated at the factory to permit field replacement of either unit without the need for recalibrating the system.

Address: 58-15 Northern Blvd., Woodside 77, N. Y.

New Developments In Aviation Computers

A novel combination digital-analog computer, called "Wedilog," operates on the principle of functional simulation but employs digital numbers instead of voltages.

The new Wedilog computer, developed by Wang Laboratories, will solve linear and non-linear ordinary and partial differential equations, integral equations, and simultaneous differential and algebraic equations.

It combines the conventional d c analog computer's simplicity of problem set-up with the accuracy and resolution of a digital computer. Machine resolution is five decimal digits. All numbers are handled as a true number with sign. Company's address is 37 Hurley St., Cambridge, Mass.

Other new computer developments of interest to the aviation industry include:

• **Alwac III,** designed for use by small organizations, is the latest addition to the line of digital computers produced by Logistics Research, Inc.

New Alwac III operates at twice the basic computing speed of earlier models, has storage capacity for 2,048 additional words in its main memory, and twice the capacity in its fast access storage (128 words). Thirty additional commands have been added.

Machine uses magnetic memory drum capable of storing 4,096 words, or 8,192 if required. It operates from punch-tape input-output.

Alwac III occupies approximately 24 sq. ft. of floor space. Manufacturer's address: 141 So. Pacific Ave., Redondo Beach, Calif.

• **Readix** is a decimal, serial, single address machine with magnetic storage capacity of 4,000 words. Each word consists of 10 decimal digits with sign, or two commands, complete with address. Machine uses more than 50 basic commands, and can modify its own instructions. Electric typewriter is the input-output medium. Manufacturer: J. B. Rea Co., 1723 Cloverfield Blvd., Santa Monica, Calif.

• **Rea: Series 400,** superseding earlier Reeves electronic analog computers, permits problem verification and checking directly from the problem equations. New machine also has servo multipliers and resolver servos with improved dynamic response, amplifiers with greater bandwidth and larger power output, and auxiliary equipment of improved stability. Building block construction used throughout permits computer to be tailored easily to problems and simplifies maintenance.

For further information, write to Reeves Instrument Corp., Sales Dept., 215 East 91st St., New York 28, N. Y.

Avionics Bulletins

Recently announced bulletins and reports of interest to the avionics industry include:

• **Digital computer design** and circuitry for two large-scale machines, the general purpose Midac and the special-purpose Mydac, are described in 116-page report prepared by the University of Michigan's Willow Run Research Center. Report No. 1947-3-T can be obtained from University of Michigan Press, Ann Arbor. Price is $2.00.

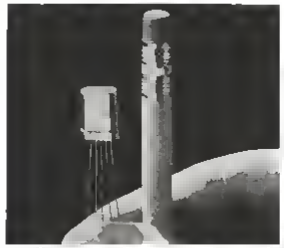
• **Compression mold-headers** for use in all types of hermetically sealed components. Ask for Cat. No. 200 (16 pp.). Hermetic Seal Products Co., 29-37 South Sixth St., Newark, N. J.

• **Self-synchronous motors,** 30 different models for instrument system use. Ask for folder EI-5A (8 pp.). Electric Indicator Co., Inc., Sprlegdale Conn.

New Midgets Join Avionics Lineup

A tiny new relay, called by its manufacturer the "world's smallest shock-resistant relay," is one of several recently announced subminiature components of interest to designers seeking ways to cut the size and weight of avionics equipment.

The new midget relay, called "Neo-



mute," is housed in a ½-in.-high transistor case and weighs only 0.035 oz. The unit's contacts are rated at ¼ amp (non-inductive), and it operates from 26 v d.c. Normal sensitivity of 100 milliwatts can be adjusted down to approximately 40 mw.

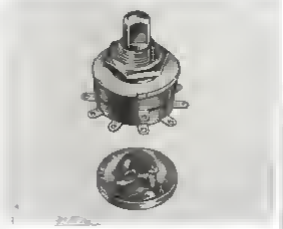
Manufacturer: Elgin-Neomatic, Inc., 9010 Bellanca Ave., Los Angeles 45, Calif.

Other new miniature components include:

• **Rotary trimmer capacitor**, measuring only ⅜ in. long x ¼ in. dia., is available in two sizes: 0.5 to 3.0 $\mu\mu f$ and 1.0 to 4.5 $\mu\mu f$. Q is 500 at 50 mc and temperature coefficient is 200 ppm.

Manufacturer: Corning Glass Works, Corning, N. Y.

• **Selector switch** with positive detent action, measuring approximately 1 in. dia. across the terminals, is available in single-deck models with 2 to 10 positions. Contacts are rated at break 1 amp at 115 v a.c. (resistive load). Bulletin 114A gives application data on new Series 24 switches.



Manufacturer: Grayhill, 561 Hillgrove Ave., LaGrange, Ill.

• **Instant-release hinge** serves as both a

[illegible] distance for side panel and brackets in electronic chassis. New miniature model measures only 1¼ in. long, contains spring loaded finger pad for detaching.

Manufacturer: Burklyn Co., 3429 Glendale Blvd., Los Angeles 39, Calif.

• **Sealed panel instruments,** measuring only 1¾ in. square, are available in variety of types, including d-c. microammeters, milliammeters, ammeters, and voltmeters. Model 100 s accuracy is quoted at within 3% full scale, scale length is 0.738 in.

Manufacturer: DeJur Amsco Corp., 45-01 Northern Blvd., Long Island City 1, N. Y.

Avionics Companies Report Expansions

Texas Instruments, Inc., Dallas, a major transistor producer, has purchased the business and assets of the Radell Corp., Indianapolis, manufacturer of deposited carbon precision resistors. Operations are being transferred to the Dallas facility without interruption of deliveries, TI says.

Other new mergers and expansions in the avionics industry include:

• **Fairchild Camera & Instrument Corp.,** Syosset, N. Y., has acquired all the voting stock of Freed Electronics & Control Corp., New York, specialists in ultrasonic and radar display, storage and recording techniques. Freed will retain its corporate identity, operating as a Fairchild subsidiary.

• **Mag-Electric Products, Inc.,** Hawthorne, Calif., maker of magnetic amplifiers, power supplies and transformers, has acquired all the assets of Mag-Electric Networks, Inc., maker of radar components.

• **Textron American, Inc.,** Detroit, (formed by the merger of Textron American Woolen Co., and Robbins Mills) has purchased Ryan Industries Inc., maker of aerial cameras, and electro-mechanical equipment.

• **California Testing Labs, Inc.,** Los Angeles, has expanded its environmental and qualification test facilities and services through the acquisition of California Electronic Services Co., which specializes in radio interference testing.

• **Helipot Corp.,** Pasadena, Calif., maker of precision potentiometers and components, will consolidate all of its administrative and manufacturing operations in new facility to be constructed at Newport Beach, Calif., and slated for occupancy in mid-1956.

• **Radio Receptor Co., Inc.,** producer of semiconductors and electronic equipment, is moving to new 66,000 sq.-ft. factory at 80 N. 5th St., Brooklyn, N. Y.

• **Electronics Corporation of America** [illegible] its headquarters, labs, administration and sales offices to a new 105,000 sq. ft. facility at 1 Memorial Drive, Cambridge, Mass., late this year.

• **Motordyne, Inc.,** Monrovia, Calif., maker of small motors, dynamotors and inverters, has added 14,000 sq. ft. to its plant, doubling previous capacity.

Backward-Wave Tube Designs Reported

Two new backward wave tubes, providing voltage tuning over a wide band, are among the recently announced microwave devices of interest to radar and countermeasures equipment designers.

Stewart Engineering Co. announces its Type OA7 11 50 helix type backward wave oscillator, offering continuously voltage tuned operation over the frequency range of 5.8 to 11.6 kmc.

Unit reportedly provides minimum power output of 50 mw. over the 7.0 to 11.6 kmc. band, and at least 5 mw. over its entire frequency range. Variations of load, from perfect match to a short circuit of any phase, results in less than 1% frequency shift in the absence of pads between the tube and its load, according to manufacturer.

Company's address: Box 277, Soquel, Calif.

Huggins Laboratories, Inc., announces a similar tube covering the range of 7 to 14 kmc., which can be swept across this band in less than one microsecond. Tube has 10 mw. output. Address: 711 Hamilton Ave., Menlo Park, Calif.

Other new microwave devices:

• **Air-to-air heat exchanger,** kidney shaped, for use in cooling airborne radar indicators. Cooling air travels through the shell of the exchanger and in turn cools fan driven air from the radarscope housing. Unit is made by AiResearch Manufacturing Co., Los Angeles.

• **High power pulse-forming network,** hermetically sealed, is for use with magnetrons and klystrons. Unit, designed to MIL specs, can be provided with 5 to 100 kv. ratings, 2 ohms or more impedance, and with pulse widths from 0.1 microseconds. Manufacturer: Luther Electronic Co., 5728 W. Washington Blvd., Los Angeles.

Avionic Firms Report Net Up, Sales Down

Annual reports recently issued by avionics manufacturers show that profits generally are up, after taxes, and in some cases before taxes, despite a slight drop in sales. Highlights of these annual reports follow:

• **Servomechanisms, Inc.,** reports a net profit after taxes of $503,900 for 1954, up 65% over 1953, despite slightly lower sales of $12,509,024—6% under the 1953 figure. Profit before taxes was up 58% over last year. Net earnings were 66 cents per share. Company paid a 40-cent dividend. Present backlog is $11.4 million, slightly under 1953.

• **Norden-Ketay Corp.** reports 1954 sales of $9,086,453, with a net profit of $1,002,922 covering operations for only Ketay Instrument Corp. prior to its merger with Norden Laboratories Corp. Net income per share was $1.01. The company gives no comparison with previous year because of change in fiscal period used. Norden-Ketay has undertaken a major program to develop "entirely new concepts of data transmission" for the Office of Naval Research.

• **Texas Instruments, Inc.,** reports gross sales of $24,387,334, approximately 10% below the 1953 figure, which TI attributes to a general decline in geophysical exploration and the military stretch out. After tax earnings were $1.7 million, or 40 cents per share, approximately 5% under 1953. The sale of military radar and sonar equipment totaled $12,829,602, down 21% from 1953. Current military backlog is $13 million. Company says it expects demand for its silicon and germanium transistors to grow during 1955.

• **Sylvania Electric Products, Inc.,** showed 1954 sales of $281,641,987, approximately 4% under 1953, with net earnings of $9,480,941 after taxes, approximately 4% under 1953. Earnings per common share were $2.92, down 6% from 1953, because of a larger number of outstanding shares. Annual dividend of $2.00 equalled that of 1953.

Company has become increasingly active in military electronics field and has established a missile systems lab and electronic systems division. Sylvania also reports activity in the fields of radar, navigation and ECM equipment for all three military services.

New Components For Servo Systems

A new miniature tubeless d.c. reference voltage source, reportedly stable to within 0.1% for 20% variations in supply voltage, is one of several recently

announced devices of interest to persons engaged in the development of servo systems.

The new Type 140RB2 voltage reference comes in two models, one operating from 24 v. d.c., the other from 110 v., 400 cps. Both have a constant 5-v. output. Special units are available for inputs of 12 v. to several hundred volts.

The device reported has a temperature drift of no more than 0.01% per degree C, and a repeatability error of less than 0.1%. Unit comes in a hermetically sealed can whose diameter is the same as a miniature vacuum tube, and whose height is 1 in. for the d.c. model, 2 in. for the a.c. version. Manufacturer: Manning, Maxwell & Moore, Stratford, Conn.

Other new servo system components include:

• **Size 15 resolver,** Type 3D 2348, requires no associated amplifiers or compensators because of unit's small variation in transformer ratio and phase shift with varying input voltage. Maximum angular error is 0.12% and maximum axis misalignment is 7 minutes, according to manufacturer. Input voltage range is 0 to 16 v., 400 cps. Input impedance is 740/79 deg.

Manufacturer: John Oster Manufacturing Co., Avionic Div., 1 Main St., Racine, Wis.

• **Chopper,** for converting d.c. signals to 400 cps., employs photocells instead of conventional vibrating elements. Absence of moving parts reportedly gives new Model 307 a minimum life of 3,000 hours. New chopper is said to be insensitive to temperature variations between 50 and 100C, and to have a noise pick-up of less than 200 microvolts rms. Unit operates from 115 v., and has a d.c./a.c. conversion ratio of 0.5. Chopper measures ¾x¾x2 in., weighs 1.6 oz.

Manufacturer: Avion Instrument Corp., 299 State Highway No. 17, Paramus, N. J.

• **Gear-drive magnetic clutches,** Series 500, weigh less than 1 oz., can transmit 1 to 15 oz. in. at speeds up to 200 rpm. Units can be supplied to operate from 6 to 30 v. d.c.

Manufacturer: Electronic Manufacturing Engineers Co., 2410 Beacon Ave., Seattle 44, Wash.

Transistor Booklet

To build a small transistorized radio receiver, audio oscillator or electronic timer in your basement, a new booklet prepared by Hydro-Aire shows circuits for nine transistorized devices. The booklet, entitled "The Transistor and You," is available free from Electronics Division, Hydro Aire, Inc., 3000 Winona Ave., Burbank, Calif.

PULQUI II FIGHTER INTERCEPTOR with top speed of 625 mph. was second jet plane built in Argentina. First was the Pulqui I.

Argentina Fosters Ambitious Air Plans

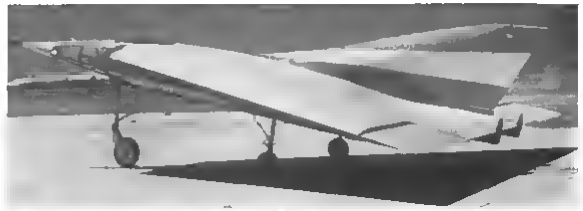
(McGraw-Hill World News)

Buenos Aires—An ambitious development program leading to construction of a supersonic delta-winged prototype aircraft is being pushed vigorously by technicians at Argentina's Industrias Aeronauticas y Mecanicas del Estado (IAME).

A full-scale unpowered model of the design, the IA 37, currently is being flown in extensive glide tests to supplement wind tunnel data and calculations. Previously, large numbers of dynamically similar models were flight tested by being catapulted to speeds simulating full-scale performance.

Next step will be the construction of a powered prototype, designed for subsonic speeds. IAME engineers will evaluate results of the tests and incorporate any necessary changes in the final, supersonic prototype.

Development of the IA 37 is part of the dynamic program aimed at a general overhaul of Argentine air power during the next two years.



IA 37 DELTA scale model is being flown in glide tests to supplement wind tunnel data.

Double Development

Both military and civil aviation are due for a thorough overhauling during the 1955-1956 period. While ground facilities are rated among the best in Latin America, the aircraft in use, though generally in good condition, are mostly obsolete.

Plans have already been drawn up for renewal of a sizable proportion of the aircraft in use. World aircraft producers are well aware of these plans, and U. S. and British manufacturers, including Douglas, Lockheed, Convair, Bristol, Rolls Royce and Blackburn have been lobbying in Buenos Aires in a hard competition for the expected orders.

Though military requirements in terms of actual dollar purchases are still a secret, a good share of the 1,140 million pesos set aside for expenditure by the Ministry of Aeronautics under Argentina's second Five Year Plan is slated to go into foreign purchases. The

Air power is a growing force in the Republic of Argentina. Autonomous since 1944, the Argentine Air Force has been strengthened by transfusions of planes and techniques from the United States, Great Britain and Germany. It is now in the process of re-equipping major segments, as well as starting on an ambitious program of local production of a light multi-purpose aircraft. Design projects for a supersonic delta-wing fighter and a four-jet transport are well on the way.

Argentina depends on air power for internal communications as much as for defensive strength. The republic administers about 1 million sq. mi., one-third of the land area of the U. S., strung out from the 25th parallel to as far south as the 69th in Antarctica—roughly the distance between Mexico City and the top of Alaska. In this huge area live about 16 million people, or about one-tenth of the U. S. population. A strong air transport industry, backed by military airlift, ties the ends of the republic together.

This exclusive report on air power in Argentina was prepared by Henry Muller, McGraw-Hill World News Correspondent in Buenos Aires, with the cooperation of government officials.

IA 24 CALQUIN light bomber-attacker is a two seater. It is constructed of wood.

same can be said of the 327 million pesos earmarked for the Ministry of Transport. Notwithstanding lack of dollar exchange, Argentina hopes to buy most of its needs in the U. S., one of the considerations being uniformity of equipment for continental defense.

Meanwhile, negotiations on the part of the state-owned Aerolineas Argentina —AA—for the purchase of five DC-7s are known to be well advanced. AA has plans to acquire a total of 10 machines, including smaller craft, which involves an estimated total of 18 million U. S. dollars.

► **Short Supply**—The stringent dollar shortage in Argentina precludes any immediate possibility of volume imports of small aircraft for civilian use, for which there is heavy demand. Indication of this is given by the recently created General Administration of Civil Aviation (Dirección General de Aviación Civil), under the Ministry of Aeronautics.

This group is to acquire 100 helicopters provided foreign exchange is made available.

On the domestic front, practically the entire aircraft output of the state owned IAME plants is currently being absorbed by the Argentine Air Force, but will be greatly increased as soon as the Kaiser group relieves IAME of its current automotive production, now estimated to take almost 30% of its man-hours.

Plans are reported completed for the establishment of an aluminum industry.

This will be backed by the necessary power supply, available as soon as some of the important hydro-electric projects are finished. Another important event in Argentina's civil transport service is President Peron's move to invite the investment of private capital for its future development.

Military Air Force

Dating as far back as 1913, when the Military Aviation School was founded as the country's first institution for aero navigation personnel, the Argentine Military Air Force has evolved considerably in the past 10 years.

Though its present fleet of planes tend to meet instruction, training and perfecting of personnel requirements, today there is an urgent need for renewal of aircraft and equipment. Most of it is obsolete, apart from wear and tear, as a result of intensive use and the scarcity of spare parts.

In 1944, the AAF was placed under a ministry of its own. Shortly after, it was completely reorganized and attained absolute autonomy directly under a commander in chief, who also was put in control of civil aviation activities.

Previously, however, the situation of the AAF was similar to that of the USAF before it won autonomy. Many of its ranking officers actively campaigned for recognition of the preponderant power of the air arm and for greater independence. The first step in that direction was taken when it was accorded the status of a command.

With the vast extent of the country, the radius of action of the AAF is enormous and planes of the Antarctic Group have flown as far south as Lat. 69° of the Antarctic continent, in the sector where the country exercises its sovereignty.

► **Command Organization**—Organically, the Argentine Air Force is constituted by a General High Command and various subordinated aerial commands which group together the basic branches of the military aeronautical

Argentina Air Force Aircraft Roster

Combat Types

20 heavy bombers, Avro Lincoln from England, 1947

150 light bombers, IA Calquin, locally built, delivered in 1946

100 fighter-bombers, Fiat G-46, from Italy, 1947

120 observation, IA 22, locally built, delivered in 1945

120 fighter-interceptors, Gloster Meteors

Training Types

200 Percival Prentice basic trainers, from England, 1950

100 IA 22s, locally built delivered in 1944

30 Beech AT-11s, from U. S., delivered in 1947

30 Fiat G-55 trainers, from Italy, delivered in 1949

Transports

25 Douglas DC-3s and C-47s, from U. S., delivered in 1944 and 1947

30 Bristol 170s, from England, delivered in 1948

30 de Havilland Doves, from England, delivered in 1947

8 Douglas DC-4s, from U. S., delivered in 1947

30 Vickers Vikings, from England, delivered in 1946

Liaison

150 El Boyero, locally built, delivered in 1950

IA 35 MULTI-PURPOSE all metal plane is completely Argentine, including its engines.

MILITARY AERONAUTICAL SCHOOL headquarters in province of Cordoba, Argentina.

institution—tactical, strategic and defense.

On its part, the General High Command responds to the Ministry of Aeronautics, and, together with civil aviation, they represent the operative branch of that ministry. The Aeronautical Quartermaster General Division is responsible for meeting the materiel requirements of both the air force and civil aviation and supplying related technical services.

There are three commands in the AAF:

• **Defense,** with responsibility for everything relative to active defense and patrolling activities, including fighter-interceptors and radar, security and control services.

• **Transport,** which supervises activities of light and heavy transport units, not only for transportation of military equipment and personnel, but also for civil missions, such as development of promotional airlines, Lineas Aereas del Estado (LADE), emergency services to other government departments and exceptional transportation requirements.

• **Tactical,** in charge of preparation and direction of attack units, fighter bombers and observation planes, which must act in cooperation with the army and navy.

▶ **Outside Influence**—The Argentine Air Force's structural organization, tactics and policies are influenced basically by three foreign powers. In its general organization, it tends to follow British methods, American practice is reflected in bombardment tactics, cooperation with the Army, maintenance system, logistics and navigation procedures, defense tactics and ground control interception operations owe much to the German influence.

The British influence stems from the fact that during 1946 to 1952 Argentina has had a steady number of officers of the Royal Air Force acting as advisors.

Between 1938 and 1946, Argentina had a U S air mission under contract but it is now believed more economical, and equally effective to send Argentine trainees to the U S.

From 1947 to 1954, Argentina's air force had as special advisor former Luftwaffe Lt Gen Adolf Galland, who returned to West Germany towards the end of January 1955.

Efficiency of Argentina's air force, as a whole, is regarded by foreign observers as good, on the basis of its flying time record and very low rate of accidents.

▶ **Naval Aviation**—Argentina's Ministry of Marine, within its naval organization, has a separate branch known as the Fleet Air Arm (Aviación Naval), which is used almost exclusively in the Antarctic region, both for reconnaissance and for scientific investigation. In recent times, helicopters have played an important role in this activity.

The Ministry of Marine has its own air training school at Puerto Belgrano for recruiting of personnel, and has naval air stations all along the Southern Atlantic coast. It operates a regular naval air transport service between Buenos Aires and Ushuaia.

Aeronautical Industry

Industrias Aeronauticas y Mecánicas del Estado is a state organization, constituted by a group of plants which are mainly devoted to the construction of aircraft and aeronautical materiel, as well as automotive vehicles. Its main research and production center is in the province of Córdoba.

IAME at present employs about 13,000 workers. Over 70% of the man hours so far have been in aeronautical activities. IAME's installations in Cordoba cover more than 1.5 million sq ft, involving an investment estimated at almost 1 billion pesos. Employment figure does not include those working in dependent industries of IAME, which have facilities for producing aircraft, engines, turbojets, aeronautical instruments, spare parts and parachutes. It is the most important light metallurgical industry in South America, and embraces some 930 large and small plants and workshops—670 in Buenos Aires, 135 in Córdoba and 125 in Rosario.

Since 1927, when the Argentine Military Aircraft Factory was first established in Córdoba, there has been a concerted move on the part of Argentine technicians to produce designs of their own, apart from the construction of planes and engines under license.

Thus, in 1928, the Military Factory, which years later was to become the present highly mechanized IAME works, started to produce under license the Avro 'Gospart,' a World War I type of trainer craft, of which some 100 units were turned out; in 1929 the plant delivered 40 "Bristols," an observation biplane, with an in-line motor, as well as some 40 Dewoitine D-21 fighters, equipped with Lorraine-Dietrich 440 hp engines.

▶ **Research Started**—In 1930, IAME began intensive research in an attempt to develop designs of its own. Among other types, some 300 observation planes, bombers, training and transport machines were turned out under their respective serial numbers AMO-1, AMB 1, AME 1, AeT 1.

In 1937, however, the Córdoba factory returned to producing engines and planes under license. Patent rights were acquired of the Curtiss Hawk 75 and Focke-Wulf 44-J Stieglitz, of which 200 and 500 were produced locally, engines included.

As of 1943, the Córdoba establishments reverted again to active research development and production of planes of their own design. Since that year they have delivered:

• **220 units of IA 22,** advanced two-seater trainer and scout plane (DL-

IA 22 ADVANCED TRAINER and observation plane was built wholly in Argentina.

MODERN AIRPORT at Ezeiza, Argentina, is equipped for domestic and international flights

DL/24), equipped with 415 hp Armstrong Siddeley Cheetah engine (adaptation of North American Texan AT-6).

• **100 units of the IA 24** Calquin, light two-seater, bomber-attacker, equipped with two engines, locally made, and similar to the de Havilland Mosquito

• **150 units of El Boyero,** lightplane for liaison, gunnery control and training purposes for civil aviation, equipped with imported engines, either Continental or Lycoming.

▶ **First Jet**—Major efforts of IAME's research and development work resulted in producing in 1947 Latin America's first jet-propelled plane. With conventional wing end equipped with Rolls-Royce Derwent turbojets, only one was produced. It was known as Pulqui I.

With the help and experience of foreign technicians, including Kurt Tank, former technical director of the German Focke-Wulf firm, and presently chief consultant of IAME, the Pulqui II was developed, and six have been constructed.

Pulqui II is a high midwing cantilever fighter monoplane, with 45-deg. sweepback, with wing area of 268 sq ft. Its powerplant consists of one Rolls-Royce Nene 2 centrifugal flow turbojet. Its maximum speed at 16,400 ft is 652 mph, and rate of climb 5,850 fpm. It has an absolute ceiling of 49,200 ft and its landing speed at 8,800 lb is 106 mph.

Presently, the research laboratory of IAME's Aerotechnical Institute, which possesses Latin America's only supersonic wind tunnel, is well advanced in developing a supersonic delta-wing craft.

What's Next

IAME's future production program includes construction of the IA 35, to be known as Justicialista del Aire. With top priority, full production will start on a first series of 100 units towards the end of 1955 and throughout 1956, at an estimated cost of over 1.5 million pesos per plane.

It is a low-wing all-metal multi purpose plane, and is destined to satisfy immediate requirements of the military and civil aviation. It can be used as a bomber trainer, for instruction and advanced training, exploration and reconnaissance, including photographing, light transport for cargo and passengers, and for ambulance purposes. Its crew would vary between 4 and 11, according to what use is made of it.

Its powerplant will consist of two IAR 190 El Indio engines, locally made, and with normal cargo it will weigh 7,700 lb, and have a cruising speed of 220 mph. Ultimate production total depends on the automotive work that the recently established Kaiser enterprise, Industrias Kaiser Argentina—IKA—takes over from IAME.

Second on the list of priorities is construction of four types of planes for civil aviation: a two-seater 65-hp aircraft for instruction, a two-seater 65 hp plane for touring, a four-seater executive plane, similar to the Ryan Navion, with a single 95 hp engine; and a six-seater executive plane with two 95 hp engines. All engines will be locally made.

Third priority is given to a four motored jet-propelled transport to be totally constructed in Argentina. With four jets, it will have an average speed of 435 mph and a capacity for 40 passengers. Kurt Tank aided in its design. It is also planned to construct a cargo carrier powered by four engines, to be made locally.

In design, Argentine experts in their recent research undertakings in the jet propelled field have tended to follow the British trend.

In regard to engines, IAME is now working on the production of light types, in-line or radial, which will be used to power most of the planes

which its future production program calls for. When Kaiser takes over, IAME will also give priority to production of machine tools, which will primarily be used in the air industry.

Laboratory Produces 'Super Purity' Metal

Germanium with impurities of about one part in 10 billion is prepared routinely in Westinghouse Research Laboratories, Pittsburgh, in "super purity" program on titanium and other hard-to-get materials.

Basic process, called cage zone refining, depends on metal impurities having a preference for either the liquid or solid state of the material. For example, when a bar of impure titanium is melted progressively from end to end, the iron concentrates in the liquid titanium and follows the molten zone to the end of the bar. This end can then be cut off and discarded and the process repeated for maximum removal of impurities.

Westinghouse scientists have developed a method of melting the metal by using the material as its own crucible, preventing contamination from any container. In a low-pressure inert argon or helium atmosphere, a square sectioned titanium bar stands on a metal platform. Platform is slowly raised through a heating coil. High frequency 10,000-cycles-per-second current flows in the coil and induces large electric currents inside the bar. These eddy currents cause the metal to melt from the inside. The bar's corners rapidly lose their heat and remain rigid, thus they act as a "cage" containing the molten metal.

THRUST & DRAG

Suggested instrumentation for the new class of heli-vector aircraft is a large indicator, illuminated from behind. It would say simply:

TILT

* * *

"We find when we want to reward a qualified engineer with a manager-type job he usually is not suitable." The engineer is at his best in a creative job, Robert Gross, president of Lockheed, says.

"When you reward him with more responsibility, you put him in work he is not qualified to do. If you don't put him in a management job, how do you reward him?"

Pay him, Mr. Gross, pay him.

—DAA

AEROLAB'S SMALL CRAFT is expected to cut cost of training drone controllers.

RECOVERY CHUTE is released on demand or on failure of any part of radio system.

Model to Train Drone Operators

Pasadena, Calif.—Navy has completed acceptance tests on a new radio controlled drone for use in training target drone controllers.

The small craft is manufactured by Aerolab Development Co. About 550 have been ordered by the military, with 250 going to the Army training center at Ft. Bliss and the remainder to units of the National Guard.

Navy administered the contract for the Army and National Guard. Cost of the trainers is less than $500 each, about one-fifth the cost of a tactical drone. Since many drones are lost in training, use of the small trainer is expected to effect a considerable saving.

The Aerolab device (Orguy MI) is a high wing monoplane with a 6-ft. wing span. A 1 hp engine turns a 13-in. propeller at approximately 12,000 rpm. Fuselage is sheet metal, with wings and tail of balsa and nylon.

▶**Drone Control**—A five-channel Aerolab receiver controls the tiny drone through small servos which drive a movable elevator and rudder. Four of the channels control up and down elevator and left and right rudder. The fifth channel prevents deployment of the drone's recovery parachutes except by interruption of the channel. This provides a "fail safe" recovery system since the parachute is released either on demand or automatically in the event of failure of any part of the radio system.

Radio ground control box used is the same as that of present military target drones. Use of the Aerolab trainer will permit National Guard units to maintain proficiency throughout the year in drone control, thereby lowering a high target attrition rate which target control detachments have encountered during summer camp.

Speed of the Aerolab trainer is close to 60-mph with a range of 20 mi. Weight of the aircraft, including radio, battery and servo equipment, is slightly less than 16 lb. The trainer contains fuel for 20-30 min. of flight.

The device is launched from a three-wheeled cart tethered to a central pylon by a cable. It is accelerated to take-off speed while rotating in a circle about the pylon. Since this method is sensitive to wind and terrain characteristics, Aerolab also is experimenting with a catapult launcher.

Present contract is scheduled for completion by August and the target drones can be made available to other purchasers off the present production line, beginning in June, Aerolab reports. The firm also is studying use of the device as a radar trainer or tactical gunnery target.

Tape Control Guides Precision Borer

A standard four-spindle Excello precision boring machine has been adapted successfully to punched tape automatic operation by Minneapolis-Honeywell Regulator Co.

Initially used in production of gear trains for aircraft indicators, the system's suitability for high precision gyroscope parts, servo motors and other equipment is now under study. Indications are that it is especially suited to medium size production runs and promises substantially lower tooling and set-up costs than punch-press piercing dies or drill reamer jigs, and operating costs are less than for jig bores, M-H says.

▶**How It Works**—Hole coordinates and feed instructions are punched on tape and the proper adapter is attached to the rotary fixture. Cutting tools are mounted and the tape is placed in the control circuit's reader.

The machine is adaptable to a variety of hole patterns and sizes. Different piece parts are handled by changing the adapter ring and inserting the appropriate tape. Accuracy is stated to be better than 0.0005 in.

For a small number of parts the machine can be manually operated by adjusting 10 knobs in the control cabinet to handle linear travel of the cross slide and rotary motion of the holding fixture. Either automatically or manually operated, coordinate information is fed in increments of 0.0001 in. over the 8-in. linear range and 0.01 deg. over the 360-deg. rotary range.

WHAT'S NEW

Telling the Market

Multiple pressure readout systems for wind tunnels, engine test facilities, Catalog 5815, Fischer & Porter Co., 393 Jacksonville Rd., Hatboro, Pa.

How Scott Investment Casting Can Benefit You, examples of economies, Scott Casting & Manufacturing Corp., Berwyn, Pa.

Nylofast all-nylon fasteners, said to be only one-sixth the weight of stainless steel and one-half the weight of LF aluminum, are covered in folder by Anti-Corrosive Metal Products, Inc., Castleton-on-Hudson, N. Y.

Insurok laminated and molded plastics in sheet, rods and tubes, bulletin, Richardson Co., 2662 Lake St., Melrose Park, Ill.

Permacel 2I Electrical Tapes, heat curing and self sticking, Permacel Tape Corp., Advertising Services Dept., New Brunswick, N. J.

Sealed Guideroll, also rest of bearing line is described in 140 page catalog, McGill Manufacturing Co., Inc., Valparaiso, Ind.

Headed and threaded parts produced by single or double extrusion, brochure, Cleveland Cap Screw Co., 2917 E. 79th St., Cleveland, Ohio.

Metal-working induction heating equipment for forging, hardening, annealing and joining, Booklet B-6519, Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

NesTier line of small parts handling equipment, including boxes and baskets, hopper, hopper racks and shelf racks, Catalog DN-1000, Chas. Wm. Doepke Manufacturing Co., Inc., 8820 Blue Ash Rd., Rossmoyne, Ohio.

Arc welding and oxyacetylene supplies and accessories, Form ADC 848, Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.

Precision drawn closings and metal stampings, catalog, Hudson Tool & Die Co., Inc., 118-122 So. 14th St., Newark 7, N. J.

Red finder guide, (TIS-1126) also covers flux, recommendations for torch and metal arc jointing and overlaying of all base metals, Technical Information Service, Eutectic Welding Alloys Corp., 40-40 172d St., Flushing 58, N. Y.

Gage blocks for measurements in metal working, Precland Cnage Co., 9940 Freeland Ave., Detroit 27, Mich.

Hobs, cutters and broaches, booklet, Brad Foote Gear Works, Inc., 1309 So. Cicero, Cicero 50, Ill.

Tri-Ind-X industrial radiography machine brochure, Triplett & Barton, Inc., P. O. Box 3128, 831 No. Lake St., Burbank, Calif.

Piper Expands for Apache Push

By Erwin J. Bulban

Lock Haven, Pa.—Piper Aircraft Corp. is undertaking a major plant expansion costing some $400,000 to catch up on a seven-months' order backlog for twin-engine Apache business planes.

Traditionally there has been a production slowdown here in the fall. But this year, such talk has "gone out the window," says William T. Piper, Sr. Instead Piper will step up Apache output to two a day in September and expects to build some 360 twins this year, more than were made last year by all of the small-business-plane producers reporting to the Aircraft Industries Assn.

Piper built 101 Apaches last year.

"We have never built anything with the public appeal of the Apache," Piper's chief executive told AVIATION WEEK, adding that there seems to be "no limit" on the potential of the light twins. Another company official confidently thinks that the firm can sell 1.5 Apaches a day.

▶**Silver Lining**—These are the factors behind official estimates that Piper will gross between $18 million and $20 million in fiscal 1955 compared with 1954's $11.4 million. This is despite a steadily declining volume of military business, attributed to the fact primes are pulling work back to their own shops.

Current military subcontracts include ejection seats, cockpit canopies and ammunition containers for Grumman. The company this year is also filling some Army orders for tandem liaison planes and continuing work on spare parts contracts.

In addition to the Apache, expansion is forecast for the company's other civil products. Estimates are that more than 800 single-engine four-place Tri-Pacers will come off the lines this year, compared with 750 last year. Nearly 300 tandem PA-18s are expected to reach the spray/dust, farm/ranch, uranium-exploration markets in 1955 as against 200 in 1954.

This year the Apache will hit the export market with increasing frequency. Policy has been to hold up here until Piper completed a thorough field check on the first production batch of some 20 Apaches and worked out the usual run of the mill service problems that are connected with introduction of a new and more complex airplane.

Feeling is that the export market for the twin may turn out to be bigger than that of the single-engine types. Approximately 17% of Tri-Pacer production has been going overseas.

▶**Spreading the Business**—The boom in Lock Haven is also felt by the company's suppliers. These are some estimates of Piper spending for each 20-working day month, according to J. W. (Jake) Miller, general sales manager:

- $300,000 for engines with Lycoming Division, Avco Manufacturing Corp.
- $63,000 for radio with Lear Inc., and National Aeronautical Corp. (Narco).
- $44,000 for propellers with Hartzell Propeller, Inc., and Sensenich Corp.

Indications are that industry-wide equipment spending is headed upward for a long time. Significant guideposts:

- About 1,000 twin-engine business planes will be produced by the industry this year. Piper officials estimate. This would be approximately three times the production of this type of airplane last year.
- Some 5,000 business and utility planes will be built annually in the next three or four years compared with an average of slightly over 3,000 in the past few years, these same sources indicated to AVIATION WEEK.
- Majority of buyers are getting fully equipped airplanes and many are adding to the equipment they have. At Piper, the fully outfitted Apache, priced at $35,075, far outsells the $32,500 airplane on which the company based its big sales pitch. The latter plane, the firm says, usually gets full instrumentation and navigation gear installed to the owner's order after leaving the factory.

At the plant is the second production Apache fitted with the Lear L-2 autopilot, including altitude and automatic approach control. Piper has heard that other Apaches have gotten L-2 installations in the field. The factory twin also has the new Scott oxygen console for high-altitude flying.

Sales figures disclose that last year 65% of the Tri-Pacers left Lock Haven with full instrumentation. The company expects the percentage to be "much higher" in 1955.

▶**Distribution Trends**—Longer range of the Tri-Pacer and Apache has resulted in a changing distributorship pattern, with fewer and larger franchises.

In the days when the short-range tandem was the company's star product, Piper had some 60 sales areas, now there are 47 national distributors. This trend has now stabilized, the company states, with marginal operators shaken out with the decline of government-supported programs such as G.I. training.

Larger territories, increased sales and more expensive merchandise are creating a new income trend for the company's distributors. The $1 million-plus annual gross. This year Piper will have four or five distributors in that category, with another in California in the $2-million bracket.

An Illinois distributor, George Edgecumbe, told AVIATION WEEK that in April he had already done 40% of last year's business. Last month he delivered five Apaches and eight Tri-Pacers. In 1954 he grossed $600,000, this year he expects to hit $1 million.

Another trend that aids sales is increasing support from finance organizations, who are becoming increasingly aware of the stability of the business-plane markets.

Distributors today can make a collect call to a finance organization, such as Aircraft Investment, Ft. Worth, and get a customer credit approval in two hours. On a $35,075 Custom Apache, the customer pays $12,000-$13,000 down and can stretch his payments over 36 months, with interest running 6%.

The insurance with no deductibles will cost him about 3% of the list price. There are no co-signers needed.

▶**Consistent Production**—In addition to the 1,6 Apaches currently coming off

the lines daily, Lock Haven is producing five Tri-Pacers and three PA-18 tandems. Impact of the twin has been to put a tight squeeze on production areas and lessen flexibility. If Piper could figure some way of scheduling additional planes without disrupting the present line, the firm could sell from 50 to 100 additional PA-18s just in the uranium exploration market, sales manager Miller says.

But the company feels that it would rather maintain consistent production and lose some sales in certain areas. Still remembered is an experience two years ago when Piper put an extra production effort into Tri-Pacers to meet anticipated demand. Man-hours soared 25%, costs went up 10% and for six months profit slid to 1%. Result: A price increase.

Many of these production problems are expected to be eased when the new 66,000 sq. ft. addition is completed this fall. This will permit shifting Apache final assembly to the new area, which will feature a 90-ft. clear span and provide considerably more elbow room.

In line with increased production, employment is expected to increase to approximately 1,500, some 50% higher than early last year.

Aero Design Grants New Franchises

Three new franchises for twin-engine Aero Commander business planes have been granted by Aero Design & Engineering Corp., Oklahoma City.

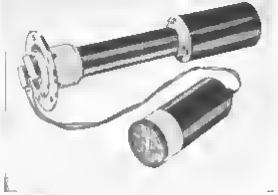
Southern parts of California and Nevada will be served by Santa Monica Aviation, North and South Carolina will be represented by Stonnell & Holladay, Easton, Md., and Venezuela, Peru, Haiti, British, French and Dutch West Indies, Dominican Republic and Puerto Rico will be served by Eteraitas Trading, C.A., Caracas, Venezuela.

Model 310 Twin Boosts Cessna Sales

Recent Cessna Aircraft Co. single and twin-engine business plane deliveries provide a striking indication of the large increase in gross commercial aircraft sales expected this year for manufacturers of twins.

In March Cessna delivered 18 twin-engine Model 310s having an estimated retail value of $1,008,000. The company also delivered 158 single-engine 170s, 180s and 195s valued at $1,935,600.

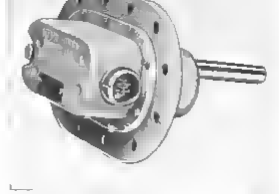
Model 310 deliveries in the first quarter totaled 34 airplanes valued at $1,888,000, single-engine deliveries came to 390 aircraft valued at $4,758,700.



Transistor Fuel Gage. Matching all the new requirements for jet flight, the new transistor fuel gage is smaller in size, lighter in weight and more rugged and reliable than previous electronic models. Combined with the Honeywell Multiplex System—one amplifier serving two or more indicators—it represents a big advance in accurate fuel measurement.

Pressure Ratio Indicator. Today's jet pilot is assured an easy, accurate take-off power check, and more economical cruise performance with the new Honeywell Pressure Ratio Indicator. It accurately measures the *ratio* of jet inlet pressure to exhaust pressure. Another model is available which measures the difference in pressures.

Exhaust Gas Temperature Indicator. In safeguarding jet engine life and assuring the pilot of adequate thrust, accurate exhaust gas temperature indication is a must. That's why this new Honeywell system, four times more accurate than any other available system, contributes greatly to more efficient and reliable flight in the ever-developing jet age.



Thermistor Level Switch. The rugged Thermistor Liquid Level Switch provides accurate, reliable fuel level control. It has no moving parts. Vital for in-flight refueling, it acts as a high level cut-off switch protecting against tank rupture and dangerous spillage. As a low level switch it can actuate valves and operate low level warning lights.

A NOTE TO ENGINEERS

Almost daily exciting new positions open in our instrument and control work. We need qualified men. If you're interested in opportunity write Director of Engineering, 2600 Ridgway Road, Minneapolis 13, Minnesota.

The coil winding machine you see here is one of three in one production line. The only ones in existence they represent one answer to the specialized demands of today's new instruments. The new coil winders produce potentiometers, are capable of winding the finest wire with an accuracy hitherto unknown, faster than ever before.

How to find out all about them. Honeywell jet instruments are available to manufacturers who require precision performance. For details write on your business letterhead to Dept. AW 5 93, at the address given below. Or if you'd like your information *right now*, pick up the telephone and call Sterling 1 8011 in Minneapolis.

With the ever accelerating developments of the jet age, there is a continual and increasing need for better instruments.

These instruments must be more reliable, smaller, lighter and, above all, more accurate to meet the extreme demands of speed, altitude and compactness that jet planes require.

These rigid requirements have caused instruments to become servo mechanisms and their development requires the same specialized techniques and engineering minds as the development of airborne control systems.

Drawing on our engineers with their knowledge of all facets of airborne control systems, Honeywell has developed a line of new instruments for jet aircraft based on the servo mechanism principle.

Part of this line of instruments is shown above. In our research and development departments there are additional instruments such as accelerometers, mach sensors and inlet ice indicators. There are others and the list will grow because, as a leading manufacturer of airborne controls, Honeywell Aero is ideally suited to produce these new instruments.

MINNEAPOLIS
Honeywell
Aeronautical Division

2600 Ridgway Road, Minneapolis 13, Minnesota

LETTERS

Model Beginnings

In the "Marquardt Story" (AW Apr 18, p 431) the brief biography of Roy Marquardt omitted one fact which I believe to be rather significant. Roy started out as a designer and builder of model airplanes—and was mighty good at it, too.

So many of our outstanding aircraft designers and manufacturers—Donald Douglas, George Page, Stanley Hiller just to name a few—benefited from youthful efforts with model aircraft that it would seem as though industry's appreciation and support of this endeavor might be universal, but strange to say, about 97% of our aviation industry chooses to ignore this important phase of aeronautical education.

It should be noted that a few far-sighted companies do recognize and are assisting model aviation in some manner. Pan American World Airways Sponsors the "Payload" cargo lifting events, Hiller has set up an annual competition for model helicopters, and last year Convair hosted the International Wakefield rubber and FAI gas powered events—both won by American teams.

Also Lockheed (Marietta) and Temco have sponsored individual modelers to national and international meets. The U.S. Navy, of course, contributes mightily to the success of our U.S. Nationals (up to 1,500 contestants) and the Air Force sponsors a great many meets for its personnel.

What better way is there to guide our youth into aeronautical engineering or trade schools than by helping to expand the instructive, wholesome hobby of model aviation? The air services know its value. When will industry get in stride?

PARNELL SCHOENKY
125 East Maple Ave
Kirkwood 22, Mo.

P.S. In case you wondered, I'm not in the model airplane business being a mechanical engineer in the flight test dept. at McDonnell and a modeler for some 24 years.

Engineer Pay Low?

Perhaps my own experience is a pertinent commentary on the "Engineer Shortage in the Aircraft Industry."

My age is 42. I have 21 years of engineering experience, 18 of it in aircraft. I hold two college degrees and expect a doctorate this year. I am a licensed aeronautical and mechanical engineer. I am also a licensed commercial pilot with a helicopter rating. I have no physical disabilities or limitations.

From personal preference I like aeronautical engineering work better than general mechanical engineering. I am competent in the entire field of aeronautical engineering. I can return to any of my previous employers in the aircraft industry—at their salary figure.

My last position in the aircraft industry paid $9,000 a year. My present position in the general mechanical engineering field pays $15,600.

I respond to every advertisement for engineering personnel in the aircraft field which asks for "senior" or "experienced" men. If no salary is mentioned in the negotiations I usually receive an offer in the $7,000 to $10,000 per year range. If, without mentioning qualifications at all, I ask for the top salary bracket under consideration I find that it is virtually never above $10,000 per year.

From this it seems obvious that the industry, as a whole, is anxious to buy knowledge, skill and experience, but is unwilling to bid competitively in the open market for this commodity.

Many competent aeronautical engineers of my acquaintance have left the field for sales or administrative work where the rewards are greater, and others have done as I have and gone to less interesting but more remunerative jobs.

NAMIE WITHERELD

ME in Carpentry

In reply to Mr. Timson's letter ("Industry Defender," AW Apr 18, p. 60) wherein he is critical of Mr. Moesel's letter, I would like to point out some of the facts which I have found to be true.

Mr. Timson called attention to the Searchlight Section of this magazine for seeking a position with the aviation industry. This I have tried on numerous occasions and I would like to quote a typical answer from one of the few companies who demonstrated enough common courtesy to reply:

"Your experience is in excess of that required for the position which we have available and we are keeping your resume on file" (meaning in the waste basket because we don't want to pay that high a salary to buy such experience) "in the event we should require the services of a person with your background in the future."

In some cases where I have avoided the salary issue until the interview I have found the companies are desirous of hiring engineers if they will work for prestige, honor or some other form of compensation which does not buy the necessities of life.

In brief synopsis, I might state that I am an electromes engineer with a pilot (ATR) background. I worked for the Civil Aeronautics Administration in the capacities of an electromes engineer and an Airway Flight Inspector.

I also wish to point out that the CAA has more respect for the knowledge and know how of these engineers, flight inspectors, aviation safety agents and other personnel which they employ, than does private industry. They have the problem of their hands being tied by congressional appropriations and Civil Service regulations, and thereby are limited as to the salaries they can pay for the very competent people which they miraculously keep on their staff.

As for the engineers who have left the field, and entered sales or some other well compensated field. I personally can supply the names of at least 15. All of them have approximately the same reasons, not enough compensation relative to other fields. I can even go as far as to name one who has a masters degree in engineering and is working as a carpenter because the pay is higher.

There would be no shortage of engineers if the pay were commensurate with other occupations. The trouble is we have so many engineers that the law of supply and demand has forced them into other types of employment.

ROBERT E. HAYDON
211 N. Elmhurst Ave.
Mount Prospect, Ill.

Decca vs. Tacan

I have followed with interest the controversy reported in AVIATION WEEK concerning VOR/DME versus Tacan.

It is odd to find that in all the arguments presented for a common short—and medium—range aid no mention is made of the Decca Navigator System.

This system gives a position accurate to yards, not merely a bearing and distance, and can be used in both fixed wing aircraft and helicopters as it works from ground level upwards. It is not affected by mountains or other topographical features.

As a commercial pilot I have used the system for nearly three years and have found the pictorial presentation given by the Decca Flight Log far superior to anything else I have ever used. It is equally suitable for airliners or off-ways flying, and I have found it to be sufficiently precise to use for instrument approaches when the cloudbase has been as low as 200 ft. at airfields where no other aids were available.

Since helicopter operations are becoming increasingly important it would seem foolish to accept yet another common aid such as Tacan which does not cater to them.

W. G. POULTER
Air Enterprises (London) Ltd.
Croydon Airport
Surrey, England

Robson Supporter

I have followed Capt. Robson for some time. His work to me always appears well considered. As you of course realize, you are doing aviation a service in this country with every issue you print because you determine the situation, consider the facts, and then print the truth.

It is unfortunate that you can't please everyone all the time and I don't believe you can be too concerned about this, you must not be. Otherwise you could not cover aviation where there can be no bluffing—either you have airspeed or you don't.

Please accept my vote for you to continue to allow Capt. Robson and other such clear thinkers free expression in our land which must remain free.

V. PENDERGRAF, CMDR., USN (CSC)
Air Operations Office, Staff CTF 43
United States Atlantic Fleet

PRODUCTION BRIEFING

▶ **Menasco Manufacturing Co.**, Burbank, Calif., received contracts for nose and main landing gears for T2V-1 carrier jet trainers from Lockheed Aircraft Corp.

▶ **Oakland Aircraft Engine Service**, Metropolitan Oakland International Airport, Calif., received a $700,000-plus contract from USAF to overhaul P&W R2800 engines. Secured in bid competition at Air Materiel Command, the order increases the firm's backlog to over $1 million.

▶ **Olympic Plastics Co.**, Los Angeles, Calif., is building a new plant to house engineering, tool and die, finishing and assembly in addition to general sales and administrative offices.

▶ **Temco Aircraft Corp.**, is adding a $500,000 extension covering 76,000 sq. ft. to its Garland, Tex., plant.

▶ **Reynolds Metals Co.** will build a $3 million aluminum extrusion plant near Richmond, Va., with operation to start early next year.

▶ **Hetherington, Inc.**, Sharon Hill, Pa., aircraft and electronic switch maker, has adopted dual-film "EC" anodizing process for aluminum under license from Colonial Alloys Corp., Philadelphia, Pa.

▶ **Consolidated Engineering Corp.**, Pasadena, Calif., merged sales and service facilities with its subsidiary, Consolidated Vacuum Corp., Rochester, N. Y.

▶ **Fairchild Camera & Instrument Corp.** established a Processing Equipment Section at Hicksville, N. Y., to concentrate on design, research and production of special rapid film processing devices for military and civil use. One of the objectives is to make processing equipment an integral part of the camera. Director is Charles N. Edwards.

▶ **Fram Corp.**, Providence, R. I., fuel, air, water and oil filter manufacturer, has moved office of sales manager—Aviation Division from Washington, D. C., to main office to coordinate its activities with the Aviation Engineering Dept. Fram is appointing representatives to maintain contact with the industry.

▶ **Kelite Corp.** is new corporate name of integrated Kelite firms operating in the U. S., L. C. Sorensen is president of the new organization, incorporated in California. Kelite of Canada and Kelite of Mexico operate independently.

MICROSCOPIC INSPECTION of cross-sectioned metal specimens is speeded by new press that mounts the items in plastic in about five minutes. Plastic mounting facilitates holding specimens while their cross sections are polished. They are then etched to bring out metal's structure and magnified up to 1,000 times. To mount, sections are placed in a female die. Heating elements bring the die to 250F and powdered Lucite is poured into the die. Die is capped and 4,200 psi. pressure is applied. Cooling blocks then replace the heating element and pressure is released when temperature drops to about 150 deg. New press is used in metallurgical laboratory of Temco Aircraft Corp., Dallas, Tex.

ANAHEIM grinder polisher department.

Northrop Produces Precision Optics

Precision glass surfaces are being made on a production basis for use in guided missile and other research programs by Northrop Aircraft, Inc.'s Anaheim, Calif., division.

Included are lenses for an optical radar plotting board, tooling optics for test fixtures used to inspect optomechanical range finders and large glass surfaces for a guided missile project.

Northrop-Anaheim has 12 grinders and polishers with a combined capacity of 29 spindles and the firm has ordered an optical filming machine capable of coating parts up to 36 in. in diameter.

The Anaheim division currently employs 1,400.

Navy Contracts

Contracts recently announced by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11, are:

Melstrom Mfg. Corp., 74 Lafayette St., Perth Amboy, N. J., dummy load, 58a ea., $98,894.

Northeastern Engineering, Inc., Bedford St., Manchester, N. H., radar test sets, 70 ea., $58,000.

Perve Paint Co., 6824 Stanford Ave., Los Angeles, paint, 24,000 gal., $32,640.

Red Bank Div., Bendix Aviation Corp., Eatontown, N. J., panels and generators, $778,761.

Scintilla Div., Bendix Aviation Corp., Sherman Ave., Sidney, N. Y., contact assys., $83,771.

Taylor Metal Products Co., 315 W. 6th St., Mansfield, Ohio, anchor mooring, $8a,990.

Tuco Products, Inc., 95 Fairmount Ave., Philadelphia, 25, compound, $28,882.

L. S. Reisz Co., 1744 Albion St., Los Angeles, relays, 8,194 ea., $35,844.

Vickers, Inc., 1400 Oakman Blvd., Detroit 32, pumps, $252,238.

Westinghouse Electric Corp., 3801 Walnut St., Philadelphia 4, controls, $438,861.

Weston Hydraulics Ltd., 10918 Burbank Blvd., N. Hollywood, valves, 70 ea., $28,256.

William Armstrong Smith Co., 168 E. Forrest Ave., Detroit, Mich., paint, 27,500 gal., $44,470.

Aircraft Industry Likely to Keep Conservative Dividend Policy

Although aircraft industry earnings are likely to remain at a high level, cash dividends to stockholders will probably not keep pace, at least in the near future

The industry finds a continuing need for augmented capital resources This is dictated by expansion requirements for plant, equipment and facilities Also, government policies, such as tightening up on progress payments, place greater capital requirements on the companies themselves

Not Always High

For a number of years aircraft earnings, as a whole, were either moderate or sub marginal So cash disbursements to stockholders were non existent, or nominal at best Dividend policies were notable by their absence

Investment commitments in aircraft equities were made not for any expectation of obtaining any current, stable income return, but for the speculative growth qualities believed present in the companies

As earnings for the group began to rise in 1951, there was some anticipation that stockholders might begin to see increased and regular cash dividends

But the industry, as a group was slow to move in that direction There was the constant need to husband resources for plowing back into enlarged and improved facilities

Furthermore, the aircraft industry, as today, was beset by the contractual nature of its operations An accurate measure of results could hardly be ascertained until specific contracts encompassing periods of 18 months and more were completed For this reason, aircraft builders were and remain loath to issue quarterly reports, and followed a course of paying irregular and sporadic dividends

Investment Pressures

As the upsurge in earnings began to make its influence felt in 1952, investment pressures toward a liberalization of dividend disbursements on a more regular basis also began to make themselves felt

This trend continued, until today most aircraft companies are converted to regular quarterly dividend disbursement This policy has been accompanied by the issuance, in most instances, of quarterly sales and earnings reports However, these interim reports are heavily qualified by the contractual nature of the group's activities For a correct perspective, a long term view over a period of years must be taken of a company's operations

As earnings continued on a sharp upgrade during the past three years, dividends were stepped up, too, but by no means in the same ratio In fact, dividend payments or "pay-outs" to stockholders have averaged on the low side

The accompanying table reveals the earnings and dividends record for the individual aircraft builders during the past three years While wide variations prevail among the separate companies, the 1952 average industry "pay-out" of 33 5% compared with 52 9% as paid by all American corporations, according to figures issued by the Department of Commerce.

The same general U S corporate compilation shows a 51 4% pay-out in 1953 and a 55 6% pay out" in 1954, compared with the aircraft industry's 34 7% in 1953 and 30 3% in 1954

In other words, the aircraft industry cash dividend disbursements, as a group, have been far from liberal

Stock Dividends

Stock dividends have also been used in the industry and may be regarded as a form of return to the stockholder

For practical purposes, a stock dividend permits the company to retain cash in the enterprise while appearing to give the stockholder a form of return

There can not be any doubt, however, that stock dividends tend to convert earnings into permanent capital and require management to earn a return on the reconverted capital

Furthermore, stock dividends serve to reduce income taxes for the recipient by translating regular income to capital gains

If the enterprise is profitable and further expansion and growth is indicated, upon which additional earnings are to be created, the stockholder may be better off to receive stock and have equity values augmented. —Selig Altschul

Aircraft Earnings and Dividends

(PER COMMON SHARE)

Company	1952 Earnings	1952 Dividends	1952 Percent Dividend Payout	1953 Earnings	1953 Dividends	1953 Percent Dividend Payout	1954 Earnings	1954 Dividends	1954 Percent Dividend Payout
Beech	$3 82	$0 60	26	($3 87)	$1 20		$5 64	$1 00	18
Bell	3 46	1 50	43	3 02	2 00	51	2 88 (a)	1 25 (a)	44
Boeing	8 07	2 67	31	12 01	3 50	25	11 39	3 00	26
Cessna	1 59	0 00	31	1 84	0 50	30	2 97	0 50	17
Chance Vought	N A	N A	N A	N A.	N A	N A	6 15	0 80	13
Convair (c)	3 40 (b)	1 75	60 (b)	4 31 (b)	1 80	42 (b)			
Curtiss-Wright	1 92	0 80	66	1 28	0 50	47	2 85	1 00	43
Douglas	6 80	3 75	42	15 46	6 80	42	14 70	5 00	44
Fairchild	1 30	0 00	44	1 74	0 80	46	1 43	0 80	66
General Dynamics (c)							9 44	3 00	32
Grumman	6 67	2 50	75	8 06	2 00	25	6 01	2 30	45
Lockheed	3 61	1 20 (a)	33 (a)	6 75	1 80 (a)	32 (a)	7 64	2 60 (a)	35 (a)
Martin	3 00 (b)	None	None	7 06	None	None	7 60	1 00 (a)	13 (a)
McDonnell	4 49	1 50	32	6 15	1 00	16	5 01	1 00	20
North American	2 60	1 25	66	5 72	1 50	40	6 45	2 70	43
Northrop	4 22	1 00	24	3 54	1 00	27	5 28	1 00 (a)	18 (a)
Republic	7 52	1 14 (a)	10 (a)	5 93	1 50 (a)	22 (a)	6 71	2 50 (a)	30 (a)
Ryan	2 66	0 60	23	3 90	0 50	13	5 18	0 50	10
United Aircraft	5 10	2 00	30	0 22	2 75	44	7 38	3 50	48
AVERAGE			33 5%			34 7%			30 3%

NOTES All computations on outstanding share capitalizations prevailing during year
(a) On adjusted average shares outstanding during year
(b) Excludes nonrecurring and special items.
(c) Convair merged into General Dynamics for 1954.
(d) Plus 10% stock dividend.
( ) Deficit.

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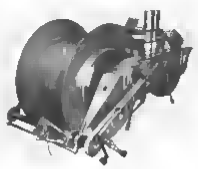

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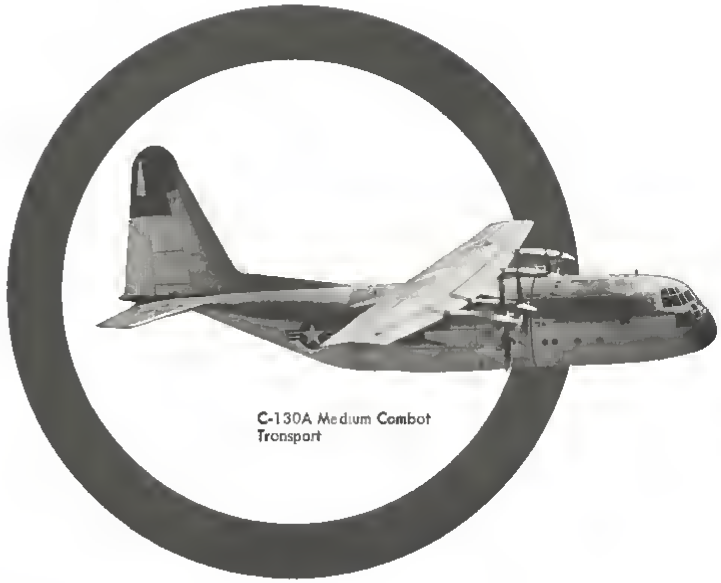

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Experts Review Aircraft Deceleration

By George L. Christian

The problem of stopping fast aircraft within reasonable distances on the ground has ramifications reaching into the areas of braking, auxiliary stopping methods, reverse thrust devices and airport construction.

And some of the same factors that enable a plane to fly fast—such as wing sweep and thinness, and general cleanness of design—make the job of stopping the craft more difficult.

This situation and what to do about it were discussed by the panel on "Ground Deceleration of Aircraft" during the recent Society of Automotive Engineers' meeting in New York.

Why So Hot?

Modern jet planes land so hot—faster than their stall speed—for a number of reasons. Republic Aviation Corp. engineer, R. C. Bergh, outlined them as follows:

- High wing loading makes a fast approach mandatory.
- A swept or delta-wing aircraft cannot be side-slipped in case the approach is too high.
- High lift coefficient of a wing cannot be used to full advantage with delta-wing planes—the pilot cannot get a high enough angle of attack without bumping the aircraft's tail.
- Flight control efficiency at slow speeds is marginal.
- Engine acceleration is slow—eight to 10 seconds is required to achieve full thrust from idle, if engine is accelerated faster, compressor may stall and burn off turbine buckets.

Convair's representative dissented on two points. Speaking of the still classified B-58 Hustler, a supersonic, delta-wing bomber, he said that the plane could achieve a 17 deg. nose-up attitude, and that the General Electric J79 turbojet engines could accelerate from idle to full thrust in four or five seconds. Thus is possible because of the powerplant's constant speed characteristics, he said. Another advantage of this constant speed characteristic is that the plane's hydraulic pumps are kept up to speed and therefore give near maximum output even during approach, when hydraulic services are needed.

Broke Problems

In 1930, typical landing speed was approximately 30-40% of its top speed. Today, the ratio between these speeds is about 5:1 or 6:1, and it will soon stand at 10:1 or higher, said the Republic panelist.

When a plane's landing speed jumps from 100 knots to 150 knots, you have 225% the energy to absorb in stopping.

The following figures show, in terms of energy the brakes must absorb, how the task is growing. Figures are for the original design of a fighter, current model of the same plane, and for a new fighter design.

	Normal Stop Ft. Lb.	Aborted Takeoff Ft. Lb.
Original Design	2,000,000	3,000,000
Current Model	4,300,000	11,000,000
New Model	8,000,000	15,000,000

A panelist cited these figures to show difficulty of slowing a fast plane in the initial phases of landing.

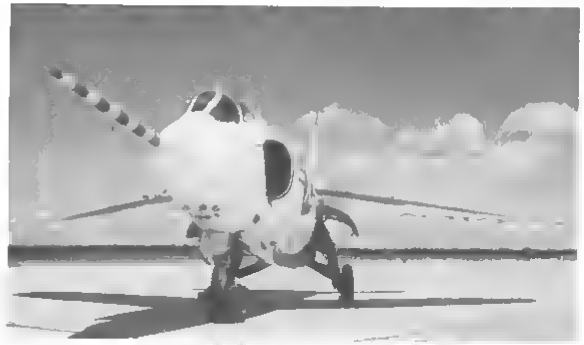
With a deceration rate of 5 ft./sec.², a plane covers 840 ft. slowing from 150 to 135 mph. The same plane covers only 48 ft. in slowing from 15 to 0 mph.

On another aircraft, more than 60% of the stopping distance is used in decelerating from 150 to 100 mph., and only 10% from 50 to 0 mph.

▶ **Bigger Job, Smaller Brakes**—The Goodyear Tire & Rubber Co. representative, A. W. Cook, enumerated some of the problems facing brake, tire and wheel manufacturers. The demand is for brakes that are smaller, yet capable of doing more work than ever. In effect the brake has to do the same job as the engine, only in reverse and for a much shorter period of time.

Because wings are thinner, airframe designers can no longer tuck main gear in the airfoils, but must turn to the fuselage, as in the Grumman F11F-1.

NORTH AMERICAN F-100's thin wing forced designers to tuck landing gear in fuselage.



GRUMMAN F11F-1's knife-like airfoil could not take any part of the landing gear assembly.

DYNAMOMETER simulates landing loads

Tiger and the North American F-100 Super Sabre.

Also, brake manufacturers must find higher-temperature materials or they will have to go to heat exchangers, the engineer said. Brake temperatures are already up to the maximum limits of steel, Cook pointed out.

Wheels are facing the same problem. Magnesium is a good metal for wheels, but new alloys will have to be found to withstand tomorrow's 400F wheel temperatures, Cook said. Bicycle landing gear configuration, such as used on Boeing's jet bombers, the B-47 and B-52, does not allow plane weight to transfer rapidly to the landing gear, making deceleration immediately after touchdown difficult.

Tire design is already past the 250-mph speed mark. Problems here are bead separation at high speeds and the temperature extremes that tires have to withstand. Answers lie in finding new materials and manufacturing methods.

Aircraft tire development is not cheap, Goodyear said. The company recently put into operation a new dynamometer costing $500,000. The machine, driven by a 200-hp reversible motor, is 14 ft high, weighs 113 tons and can simulate aircraft landing loads up to 60,000 lb per wheel at 250 mph. It can develop up to 104 million ft-lb of kinetic energy. The unit can accommodate tire sizes up to 70 in. in diameter. Ten-foot-diameter steel plates can be added to or removed from the flywheel to vary its weight.

The dynamometer has test facilities on each side of the flywheel to permit two tire, wheel and brake assemblies to be tested alternately. Machine automatically records speed, stop time, torque, brake pressure and other pertinent data.

Anti-Skid Devices

Hydro-Aire's spokesman, O. Wilkinson, discussed anti-skid devices. This type of mechanism is designed to provide a pilot with automatic optimum braking efficiency regardless of speed of aircraft or runway condition (wet, icy or dry).

Hydro-Aire's Hytrol (and similar devices) achieves this by automatically limiting braking pressures to low values at high roll speeds and by giving high braking pressures at low roll speeds.

The device can also be used for push-button braking of drone aircraft, allowing them to be stopped without skidding the main wheels.

Wilkinson said that during the last four years his company has been able to cut Hytrol's weight from 10 to 4 lb per wheel. He said one installation has been in service for over four years and has given less trouble than any other piece of equipment on the airplane.

Hytrol was designed and patented by Boeing, and is licensed to Hydro-Aire for manufacture. Other similar devices in this country are Westinghouse Air Brake's Decelostat and a Goodyear development. The English firm, Dunlop, markets the Maxaret unit, which is installed on the Vickers Viscount, and a French Company has also developed a unit.

Anti-skid devices are used on 44 different types of aircraft all over the world.

What It Costs to Stop 4-Jet Medium Bomber

Item	Lb	Money
Four wheels, brakes and tires	2,100	$8,000
Four wheel anti-skid system	75	2,400
Four jet reverse system	600	60,000
One drag parachute system	150	1,000 (est.)

If a tail hook or similar stopping system were added, weight and cost would increase 500 lb and $5,000.

Other Devices

Other deceleration devices discussed by the panel:

- **Drag parachutes.** The 32 ft-dia drag chute used to slow the B-47 exerts a 38,000 lb pull when opened at 160 knots—a good example of the huge amount of work such deceleration devices can do.

A panelist said that a drag chute does twice the work a brake does when used to stop a plane which aborts a takeoff at 10 knots under unstick speed.

However, drag chutes cannot be used in 30-knot crosswinds which are at

45 deg to the path of the plane. Also there is the problem of retrieving the chutes if jettisoned on the runway, inspecting, repacking and storing them.

This will pose a problem to civilian airlines, since no commercial carriers are equipped with parachute lofts (with the exception of Formosa based Civil Air Transport which does provide its pilots with parachutes because of the often hazardous missions they fly).

Importance of indoctrinating crews in how to use and care for drag chutes is underlined by the fact that one Air Force squadron increased the life of its chutes from four or five landings to 40-50 landings after a thorough instruction in use of the devices.

• **Reverse thrust.** Reverse-pitch propellers and reverse thrust devices for jet engines are about equally efficient—both give about 50% of an engine's total thrust in reverse, the panel heard. And both reduce ground roll by about the same amount—approximately 44%, according to a Wright Air Development Center spokesman.

Using jet reverse, a pilot can make his landing approach with 100% power and partial reverse thrust. In case of a go-around, he can cut reverse thrust and have full forward thrust in about 1 sec. This compares to 8-10 sec required to get full thrust out of a jet engine whose power has been reduced for the approach.

The device can also be used to slow a fighter down for slow moving targets and to avoid overtaking an aircraft ahead.

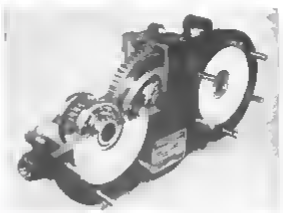
Thrust reverser's weight penalty of about 150 lb for current aircraft is not considered severe because it can replace drag chutes and possibly speed brakes, WADC said.

Turning 1,200F exhaust gases through approximately 50 deg is perfectly feasible, but the device could cause critical center of gravity problems if added to the tailpipe of a single-engine fighter. It poses no such problem if installed on a podded engine.

Other requirements reverse thrust device must fail safe—and must be incapable of inadvertently reversing in the air, the unit must not have any appreciable affect on the engine's forward thrust, must not affect a plane's control surfaces, must not impinge on any part of the airframe, and must not cause the engine to ingest foreign matter at low speeds.

USAF has experimented with installations on a Lockheed T-33 and a Republic F-84F, WADC reported.

Lockheed has a study contract to investigate reverse thrust installation problems and Goodyear and Aerojet have contracts to study directional control features of afterburner and non-afterburner jet engine exhausts.



Self-Lubricated Drive

New hydraulically powered airborne accessory drive gear box is self lubricated and may be used as a continuous-duty unit. Hydraulic motor may be used as driving member, drive and a.c. and d.c. generator says manufacturer, Western Gear Works, Box 192, Lynwood, Calif.

Arresting Devices

BuAer's J. C. Terry gave these details of three aircraft arresting devices:

• **Arresting cable** used with a hook on the plane. This is standard procedure for stopping aircraft aboard a carrier.

• **Landing gear barrier.** This device allows the nose gear to pass over, then engages the main gear which must drag an anchor chain down the runway. Good for dry runways, this method is less effective if they are wet or icy. It is being installed at all Navy fields from which jet aircraft operate.

• **Wing barrier** arresting unit allows the nose and canopy of a plane to go through it and applies stopping force to the wing. It is unusable with multi-engine aircraft or planes with highly swept wings.

A general barrier problem is that nylon, which goes into most of them, becomes brittle in extreme cold.

Airport Problems

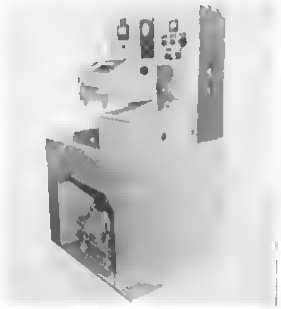
T. Sullivan, representing the Port of New York Authority, discussed airport problems associated with fast-landing aircraft.

Airframe designers must hold landing speeds down so that planes can be stopped on runways of existing length—in the 7,500-ft. to 9,000-ft. category, he said.

Cost of lengthening runways is high—$500,000 for a 1,000-ft. extension, Sullivan said. This is because the runway usually selected to be lengthened is the instrument strip, which means relocating the inner, middle and outer markets, and ILS and GCA equipment.

The $500,000 includes all costs additional land, extending runway lights, putting in a 14-in. thick, heavy duty runway capable of handling aircraft weighing 150,000 lb. and more.

NEW AVIATION PRODUCTS



Tests Elastic Properties

Dynamic damping and elastic properties of rubber, rubber-like materials and plastics can be tested under conditions of strain, temperature and frequency in studies of vibration and shock isolation value.

Dynamic modulus testing machine has variable speed of 2-60 cps and specimens can be flexed to amplitude of ±¼ in. Static pre-strain may be applied in direction of dynamic strain and perpendicular to this condition.

Lord Manufacturing Co., Erie, Pa.

Copter Light Takes 1,000G

New lamp, designed for helicopter rotor installation, takes centrifugal forces to 1,000G, the manufacturer reports. The blade tip lamp was developed for copter identification and formation flying light. Kaman Helicopter Corp., Bloomfield, Conn., assisted.

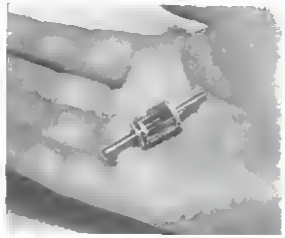
Lamp has two closely spaced, tightly coiled and rigidly supported filaments and produces about 35 cp which reflectors increase about nine times. It operates at 12 v. A resistance cable inside the rotor blade reduces the voltage from the copter's 28 v system.

Westinghouse Electric Corp., Lamp Division, Bloomfield, N. J.

New Aircraft Motors

New gearhead and direct drive electric motors have been developed to work aircraft pumps, flaps, compressors, landing gear and armament accessories. Fan cooled and explosion proof, the equipment comes in frame sizes of 2, 2½, 3, 3½ and 4 in. od. Motors are available for 5,600, 7,300 and 11,300 rpm. Continuous ratings range from ⅛ to 2½ hp. Equipment is designed for 200-v, three-phase, 400 cycle electric systems.

Westinghouse Electric Corp., Lima, Ohio.



Differential Weighs 1/3 Oz.

Mechanical differential weighs approximately ⅓ oz. and is only ¾ in. in diameter.

Input shaft diameter is ⅛ in. Breakaway torque is reported to be 0.01 oz-in. The unit uses subminiature ball bearings.

Pfiometer Log Corp., 237 Lafayette St., New York 12, N. Y.

Crack-Free Chrome Process

A new chromium plating process which deposits the metal free of pores and cracks has been developed by United Chromium, Inc. The process allows plating directly on steel without nickel or copper-nickel undercoat and forms a practically impenetrable corrosion barrier.

Under the new process, the chromium does not shrink as it is being deposited, and therefore is not under the high stress found with normal chrome plating techniques, says the company.

Also, the plating has low coefficient of friction, excellent adhesion, a non-galling surface and good ductility when compared to ordinary chrome finishes. The two latter features make the process desirable for chrome plating dies; non-galling property keeps metal from sticking to the die, while increased ductility reduces possibility of chrome cracking under impact.

The bath used with the process requires only the usual plating equipment and the solution does not deteriorate, United says. No special treatment of the base metal is required, but a proprietary United Chromium compound is used in the solution.

Cost of crack-free vs. ordinary chrome plating is usually comparable, according to the company.

United Chromium, Inc., 100 E. 42nd St., New York 17, N. Y.

ALSO ON THE MARKET

Two-way radios for airport vehicles with single power input plug operate on six or 12 v, d-c or 117 v, a-c. Fleetcom, Jr, units measure 13 in. x 6½ in. x 8½ in. Prices from $350-$425.—Communications Co., Inc., Coral Gables, Fla.

Imprinter for marking legends on production items holds eight-hour ink supply.—Adolph Gottscho, Inc., Hillside 5, N. J.

Bi-directional two-speed gear-driven actuator Model 474 develops 44-in.-lb output torque using 115-v, single-phase 400-cycles and 28 v. d-c, for antenna scan drive. Built-in speed selector permits full or sector scan.—American Electric Motors, Inc., 4811 Telegraph Rd., Los Angeles 22, Calif.

New welding equipment: Heavy-duty spot welder for high duty cycle resistance joining on medium-gage sheet metal. Lower arm adjusts vertically from 13-in. between arms in closed position to 23-in.—Delta Welder Corp., 8525 Livernois, Detroit 4, Mich.

P&H WP-1 welding positioner with 24-in. table handles weldments to 500 lb. Table tilts 135 deg.—Welding Division, Harnischfeger Corp., Milwaukee 46, Wis.

Portable welding gun with parts interchangeable among various models incorporates extra-long bushing, to eliminate bearing failure due to flash carryback, the maker states.—Craft Welding Equipment Co., Detroit 3, Mich.

Cartridge heating unit, designated Fire-rod, has been operated outdoors up to 720 continuous hours at 1,800F sheath temperature.—Watlow Electric Manufacturing Co., 1376 Ferguson Ave., St. Louis 14, Mo.

Series 2300 check valve for pneumatic and hydraulic applications works in 0-10,000 psi. range. Floating poppet design is not affected by foreign particles in the fluid.—James Pond Clark, 2181 E. Foothill Blvd., Pasadena 8, Calif.

Bellows-equipped all metal 992-D motor valve is designed for industrial vats, tanks and processes as a final control element in hydraulic and pneumatic systems.—Fulton Sylphon Division, Robertshaw-Fulton Controls Co., Box 400, Knoxville, Tenn.

Electrical insulating varnish, Ulti-Meg 110, meant to be applied to missile and rocket electrical systems, has a temperature range of −55 C to +250 C for static equipment and −55 C to +200 C for rotating equipment.—Lynn Engineering & Supply Co., 1204 Russ Bldg., San Francisco 4, Calif.

Pressure control gage is operated by a micro-switch operating at preset pressures. Switch is rated for 125 v. or 250 v. a-c., five amperes or 30 v. d-c at 2 amp.—W. C. Dillon & Co., Inc., Van Nuys, Calif.

Eight-day aircraft clocks with 24-hr. or 12-hr. dials are made to MIL-C-9196 and 10400 specs. Model 618/12 lists at $195 and Model 618/20 at $220.—Wakmann Watch Co., Inc., 15 W. 47 St., New York, N. Y.

J Model Jetcal analyzer checks jet engine gas temperature and rpm systems to ±4 C and ±0.1% rpm, respectively, the manufacturer states.—B&H Instrument Co., Ft. Worth 7, Tex.

Cloverleaf hangar for lightplanes holds four aircraft in separate stalls. Standard types takes planes up to Piper Apache 512s, larger models can store Beech 18s.—Quad Corp., Worcester, Mass.

Herculite tarpaulins to protect aircraft from weather are made of nylon and vinyl plastic film, electronically welded.—Fellowcraft Engineering, Inc., 270 Jelliff Ave., Newark, N. J.

AVIATION SAFETY

CAB Report on Johnson DC-3 Loss

Poor Planning Leads to Ditching

THE ACCIDENT

At approximately 2300,[1] Dec. 22, 1954, a Douglas DC-3C, N 24320, owned and operated by the Johnson Flying Service, Inc., Missoula, Mont., was ditched in the Monongahela River because of fuel exhaustion while making an approach to the Allegheny County Airport, Pittsburgh, Pa.

Ten of the 28 persons on board, including one crew member, were drowned. The aircraft was damaged slightly by the water landing, but received substantial damage while it was being removed from the river.

HISTORY OF THE FLIGHT

Johnson Flying Service's Flight 4844 C, Dec. 22, 1954, was a CAM (civil air movement of military personnel) flight from Newark, N. J., to Tacoma, Wash., with planned intermediate stops, among which were Pittsburgh, Pa., Colorado Springs, Colo., Monterey, Calif., and Tacoma, Wash.

The crew consisted of Capt. Harold A. Poe, Capt. Joseph J. Grekowicz, and Co-pilots Clarence E. Chapman and Charles R. Carter. Capt. Robert P. Walker, the fifth crew member, was employed by the company as cabin attendant prior to the departure from Newark.

The aircraft was serviced with 170 gal. of 100 octane fuel which was placed in the two main tanks in equal amounts making a total of 225 gal., according to the weight and balance manifest. A preflight inspection of the aircraft was performed by Capt. Grekowicz with no discrepancies found. According to the company's Weight and Balance Manifest, the aircraft at the time of departure weighed 25,317 lb., which was within the allowable gross weight of 25,346 lb.; the load was distributed within the prescribed limits with respect to the center of gravity of the aircraft.

Prior to departing Newark, Capt. Poe filed with the CAA by telephone a flight plan indicating a flight to be made in accordance with visual flight rules (VFR) to the Allegheny County Airport, Pittsburgh, Pa. The route to be followed was via Amber 7, Green 3 and Red 21 Airways. The flying time to Pittsburgh was estimated to be 1 hr. and 40 min., at a true airspeed of 155 knots[2] with 2 hr. and 40 min. of available fuel.

The flight departed Newark at 2038 with 23 passengers on board. Routine en route position reports were made and at 2206 the flight reported over Philipsburg, Pa., VFR, estimating Westover, Pa., at 2219. At approximately 2220, the Pittsburgh combined CAA station/center (INSAC and Air Route Traffic Control) heard the flight calling Altoona, Pa. radio (INSAC) on the radio frequency of 126.7 mc.

As several calls to Altoona were unanswered, Pittsburgh radio attempted to contact the aircraft but was unsuccessful. Two minutes later, at 2222, Pittsburgh radio heard N 24320 calling Westover on 126.7 mc. Since Westover is a radio beacon and has no voice facilities, Pittsburgh radio again tried to contact the aircraft, but was unsuccessful. At 2225 the flight reported to Bronkville, Pa., radio that it was over Westover at 2220, VFR, estimating Pittsburgh at 2252.

Pittsburgh radio received a call from the flight at 2236 asking if fuel was available at "Johnson Marker." Pittsburgh interpreted this to mean Johnstown, Pa., and replied "Reference fuel at Johnstown, they do have 91/96 octane and lower and we're attempting to contact Allegheny Airlines at Johnstown now to see if they would be open at this time of night. The Air Guide doesn't list any hours that they are open. You'll have enough fuel to land at Allegheny County, original destination, won't you, over?"

The pilot advised he was not sure, and then requested that the runway lights at the Johnstown Airport be turned on. Pittsburgh radio attempted to contact the Johnstown Airport by telephone and interphone without success and advised the flight that they were unable to contact them at this time but would continue trying. At 2244, N 24320 called Pittsburgh radio and advised that it was over the Johnstown Airport. The pilot was asked to stand by and as soon as it was determined that Johnstown could not be contacted, Pittsburgh radio so advised.

N 24320, at 2247, told Pittsburgh radio that it had passed Johnstown and was continuing to the Allegheny County Airport. Two minutes later Pittsburgh again asked the flight if it wished them to continue attempting to contact the Johnstown Airport. The pilot then said he would continue to Pittsburgh and asked for information on other fields where he might land. This was answered. "Douglas 4320 Pittsburgh radio. Nothing for a DC-3 Douglas 4320, it's either Greater Pittsburgh or Allegheny County, over."

At 2251, Pittsburgh gave the flight the current Allegheny County weather as: Clear, temperature 20, dewpoint 10, wind south-southwest 9. When asked his altitude the pilot answered 3,200 feet. He was then given the winds aloft at 3,000 feet as being 260 degrees 10 knots. A minute later the flight advised that it was 7 miles east of the Allegheny County Airport and could see it; that it was crossing the river and could see the field lights.

Pittsburgh radio then called the Allegheny County tower and advised that N 24320, a DC-3, was approximately 10 miles east low on fuel and was landing at that

[1] All times herein are eastern standard and based on the 24 hour clock.

[2] Where necessary, distances have been converted to nautical miles and speeds to knots. The airspeed indicators of the aircraft were calibrated in miles per hour.

airport. The tower requested that the aircraft change to tower frequency. Pittsburgh radio called the flight at 2254, and asked it to contact the tower on 121.3 mc. In reply the pilot said that he did not have 121.3 mc but would contact the tower on 126.1 mc. He was advised that frequency was satisfactory.

The flight immediately called the tower and requested landing information. It was then cleared for a straight-in approach to runway 27 and asked to report when 3 miles out. The weather was given as: Wind southwest variable south, calm to 10, altimeter 29.84. At 2256, the flight reported it was 3 miles east on final approach; it was then cleared to land. At 2257, the flight reported that it was out of gas. At this time the tower observed the aircraft to be approximately 2 miles from the airport on final approach. The tower immediately asked if the pilot believed he could make the field. The pilot replied, "I doubt it very much. We have both engines feathered, we are coming down over the red lights. I don't know if we'll make it or not. We are 2,000 feet." At 2258 the pilot advised, "We are going to set it down."

The tower observed the aircraft make a left turn and head toward the south. It then disappeared from the controller's view below the hills southeast of the airport. Necessary calls pertaining to the emergency were immediately effected. The aircraft, heading in a southerly direction, was ditched wheels up in the Monongahela River at approximately 2300. The captain, Harold A. Poe, who was flying the aircraft, and nine passengers were drowned.

INVESTIGATION

Ditching was one and one-half miles south of the McKeesport, Pa., bridge and approximately two miles southeast of the Allegheny Airport. The aircraft came to rest about 35 feet from the west bank of the river at a point which is 600 feet below the elevation of the airport.

According to witnesses it floated for a

Lo Poz Omnironge

Local llamas show mixed interest in South America's first VOR nav-aid station, installed by Braniff Airways at La Paz, Bolivia, to supplement present low-frequency aids on its routes across the Andes from Peru to Argentina and Brazil. Signals from the omnirange station, made by Collins Radio Co., have been received at distances up to 130 miles, as a result of La Paz's 13,504-ft altitude. Avionics end of the station was flown in, while the "birthday cake" enclosure was shipped by water and rail.

short time and was completely submerged in approximately 15 minutes. Prior to sinking, the current of the river turned the aircraft to the left and slowly moved it approximately 450 feet downstream to a position about 75 feet from the west shore.

Following ditching, all passengers were evacuated through two emergency exits, one over each wing. None of the passengers or crew received injuries during the ditching. The last person to leave the cabin was Capt. Walker, who estimated that it took approximately 7 min. to get everyone out of the cabin and on the wings or fuselage. Some of the passengers could not swim and the icy waters made it difficult for even good swimmers to reach the shore.

After recovery from the river the aircraft and engines were examined and found to be capable of normal operation at the time of the accident. Each of the four fuel tanks contained approximately a gallon of fuel. Water in varying amounts found in these tanks was unquestionably the result of the aircraft's submersion in the river.

Co-pilot Chapman stated that the engines and aircraft functioned in a normal manner throughout the entire flight.

An examination of company records was made to determine if the aircraft had been maintained in accordance with accepted safety standards. It was found that this had been done. During the study of maintenance records particular emphasis was placed on the past condition of the fuel system and fuel quantity gages of the aircraft. No reports of malfunctioning of these units could be found.

On Dec. 17 and 18, 1954, N 24320 was flown from Seattle, Wash., to LaGuardia Airport, New York. With the exception of Capt. Walker, the same crew flew the eastbound flight. Capt. Poe was senior pilot in command on both the east and westbound flights.

While in New York, Capt. Poe contacted the Aircoach Transport Assn. (ACTA) and learned that Johnson Flying Service had a CAM flight originating at Newark, N. J., at 2030 on Dec. 22, 1954, with its destination Tacoma, Wash. At that time it was thought there would be 24 military passengers for this flight. The aircraft was not serviced at LaGuardia and after a four-day layover it was ferried on Dec. 22, 1954, to Newark Airport, landing there at 1855.

Capt. Grekowicz occupied the co-pilot's seat on the ferry flight from LaGuardia to Newark and said that when taxiing to the ramp at Newark the fuel gages registered a total of 85-90 gal. This was divided as follows: left main 35 to 40 gal., right main 50 gal., and left and right auxiliary tanks empty. However, Co-pilot Chapman stated that he thought there were 65 gal. on board prior to refueling. This was based on his observation of the fuel gages on arrival at LaGuardia, also on what he observed from the aisleway during the flight to Newark, and, by again reading the gages on departure from the ramp at Newark. He did not discuss the amount of fuel on board with Capt. Poe or the other crew members.

Upon arriving at the ramp Capt. Poe ordered 125 gal. of 91 octane fuel to be distributed equally between the two main tanks, but inasmuch as 91 octane was not

available, 100 octane fuel was accepted. Subsequently, when it was found that passenger and baggage weight was less than originally estimated, Capt. Poe changed this order to 170 gal. of fuel instead of the 125 gal previously ordered. The refueling crew then metered 85 gal. into each of the two main tanks, but did not stick the tanks to determine the total amount in each since the crew did not request that this be done.

The 23 passengers were checked in by a representative of Aircoach Transport Assn. Each passenger's baggage was weighed and tabulated on an adding machine tape. This tape was then given to the crew, together with copies of the passengers' military orders to aid them in preparing the weight and balance form and to serve as a passenger manifest.

Capt. Poe prepared and signed the weight and balance form for the flight, and Capt. Grekowicz initialed it as loaded. This form indicated that 844 lb. of baggage were in the front baggage compartment and 408 lb. in the rear baggage compartment. This latter compartment, which has a maximum allowable capacity of 350 lb., was loaded in accordance with Capt. Poe's instructions. The crew stated that the total baggage weight of 1,252 lb. did not include crew baggage weights or that of their flight kit.

The weight of each passenger was computed at 165 lb. and each crew member at 170 lb. The weight of the crew's baggage was included with their weight. Following the accident, all baggage was recovered. This consisted of 23 duffle bags, 16 gym bags and 5 crew bags.

All military baggage was completely dried and weighed by the military authorities and its total weight was found to be 1,512 lb., 260 lb. more than that shown on the weight and balance form. As the baggage was free of mud and other debris it was unnecessary to clean it.

In addition, the weight and balance listed 225 gal. of fuel at a total of 1,350 lb., 36 gal. of oil at a total of 270 lb., aircraft empty weight 17,800 lb., useful load 7,517 lb., gross load 25,317 lb., and the maximum allowable gross as 25,346 lb.

This form indicated that the rear compartment was overloaded by 58 lb., but that the entire load was distributed within the prescribed center of gravity limits of the aircraft.

Capt. Poe filed a flight plan with the CAA prior to departure. However, he did not discuss this with the co-pilot or prepare the required company Flight Plan and Log. It could not be determined where or how he committed the flight time of 1 hr. and 40 min. from Newark to Pittsburgh, or why he selected Red 21 airway for a part of the route to be flown, when that airway had been discontinued since Dec. 8, 1953.

The other crew members disclaimed any knowledge of the contents of this flight plan. The Company Operations Manual states that it is the pilot's responsibility to use current airways charts for flight planning and navigation and such charts were in the flight kit on board the aircraft.

On the trip from Seattle to New York, the flying of the aircraft was divided between two crews, with Capt. Poe and Co-pilot Chapman flying three segments and Capt. Grekowicz and Co-pilot Carter flying two segments.

Just prior to departure from Newark,

Co-pilot Chapman was told by Capt. Poe that they would fly the aircraft to Pittsburgh. Co-pilot Chapman testified that because he did not know until then that he was to fly this portion of the flight, he had not prepared in advance the required portions of the company's Flight Plan and Log. He made out this form in flight after departing Newark with some of the data supplied him by Pilot Walker, who was sitting in the jump seat.

The route indicated on this form was determined without consulting Capt. Poe to find out which route he intended to fly. As a result Chapman and Walker, using a current RF 8 chart, made out the Flight plan and Log to show a route via Amber 7, Green 3, Red 13, Red 8, and Red 13 airways to McKeesport, Pa. (However, the flight plan filed by the captain specified a route over Amber 7, Green 3, and Red 21 airways to the Allegheny County Airport at Pittsburgh.)

Examination of these flight plans revealed many errors, including distances, headings, radio frequencies, and airways.

The company's operations manual required as a minimum for VFR flight sufficient fuel to fly from takeoff to the airport of intended landing, plus 45 min. of reserve fuel (60 gal.)[*] and an additional 25 gal. to allow for variations in performance etc.

This manual also provided that an additional 12 gal. be included for use in taxiing, engine runup, and takeoff, which was not to be shown on the flight plan, clearance, or weight and balance forms.

Based on 225 gal. shown on the weight and balance manifest, the fuel consumption on the subject flight averaged 96.5 gal. per hour. Co-pilot Chapman stated that approximately 700 hp. was used for cruising. According to the company's operations manual, this is about 100 hp. more than specified.

Between Newark and Philipsburg Chapman advised Capt. Poe of ground speed made good at each check point. He also said that when in the vicinity of Philipsburg, he advised the captain that their fuel was getting low and that to continue would mean using the reserve supply, which was contrary to company instructions.

Co-pilots Chapman and Carter stated that an ADF (automatic direction finder) approach, using the radio beacon, was made to the Johnstown Airport. Also that when this approach was made neither the airport's lights nor the lights of the city of Johnstown were seen. Investigation disclosed that it was the custom at this airport for lights to be turned on daily at sunset.

It was established that on the night of Dec. 22, 1954, the lights of one runway, the rotating beacon, and a ceiling light were turned on at sunset and remained on all night. No witness was found who observed an aircraft in the vicinity of the radio beacon or airport at the time the flight reported being there.

Weather along the route between Newark and Pittsburgh was good, permitting the aircraft at 4,000 ft. to remain well below all clouds with good visibility along the

[*] For flight planning the company's operations manual specified the average hourly fuel consumption for a DC-3 to be 81 gal.

cabre route. The forecast en route winds aloft for the 4,000-ft. level, available to the crew prior to departure, were as follows: Newark to Harrisburg, 10 degrees at 20 knots, Harrisburg-Altoona, 300 degrees at 20 knots; Altoona-Pittsburgh, 270 degrees at 15 knots.

According to the U. S. Weather Bureau the flight encountered winds as forecast except that the Altoona-Pittsburgh winds were 25 knots. Capt. Poe advised Chapman before departure that the expected winds would be from the west-northwest at 10 to 15.

Johnson Flying Service, Inc., of Missoula, Mont., has been engaged in commercial flying for approximately 30 years. In 1953 the company began operating large aircraft in passenger service as a part of its irregular air carrier operation.

Mr. William H. Lockwood, because of his previous experience in this field, was employed to supervise this new operation. After a short time Lockwood was promoted to chief pilot and operations manager and placed in complete charge of the company's transport division, the position he held on the day of the accident. Mr. Lockwood was based in Seattle.

The company used two Douglas DC-3s and one Curtiss C-46 aircraft in this phase of its business. (All pilot company, and aircraft records except those pertaining to the maintenance of the C-46 aircraft were kept at Missoula.)

Besides the normal duties of operations manager, chief pilot and check pilot, Lockwood flew as captain for the company approximately 50% of the time. He stated that because of this it was necessary for him to make one or two trips a month to Missoula. During Lockwood's employment the flight operation of this division of the company was not given any direct supervision by his superiors.

Johnson Flying Service became a member of the Aircoach Transport Assn. in 1952. By contractual agreement the carrier gave ACTA the exclusive right to represent it before various government agencies for the procurement of transportation of personnel by air, with authority to enter into contracts for both official and unofficial traffic.

As a result of this agreement ACTA obtained 244 trips for the company. Notification to the company by ACTA of the awarding of each contract was accomplished by means of a teletype message to ACTA's branch office in Seattle for forwarding to Mr. Lockwood; or, in the event of Lockwood's absence from Seattle, the message was sent to the company's main office at Missoula. In addition at the termination of each flight away from Seattle captains were advised by Lockwood to call the nearest ACTA office for information pertinent to another assignment.

In the event a DC-3 was to be used it was agreed between the company, ACTA, and the military that this aircraft would be equipped to transport up to a total of 24 passengers plus 66 lb. of baggage for each. The carrier is paid on the basis of a specified route mileage and not on the number of passengers flown.

However if 24 passengers are to be transported, and for any reason the carrier decides all 24 cannot be taken, the remaining passengers must be transported first class to

their destination at the carrier's expense. All assignments must be accepted by the carrier without regard to weather, route, distance to be flown, number of crew, or amount of fuel which can be carried.

Because Chief Pilot Lockwood was away from Seattle a considerable amount of time, and since he believed Capt. Poe to be qualified, he gave him more authority than the average captain. As senior pilot in command of this flight he was responsible for crew assignment and crew coordination. On all flights captains served as their own dispatchers.

Capt. Poe hired Co-pilots Chapman and Carter at Seattle Dec. 17, 1954, prior to departing eastbound for New York. They did not receive the ground training nor take the written examinations required by the company's operations manual.

Capt. Grekowicz, who had been a co-pilot for the company, was making his first roundtrip as a captain. He received his Airline Transport Pilot rating from a company pilot, who was a designated CAA flight examiner, just prior to departing Seattle on Dec. 17, 1954. Capt. Walker was hired by Capt. Poe as a cabin attendant at New York for the westbound trip to Seattle. He was a former captain for Johnson Flying Service and was furloughed in March 1954.

ANALYSIS

The chief pilot and operations manager had many duties. Since he was frequently away from base flying another company aircraft he delegated some of his duties to Capt. Poe and another pilot. These men were both made check pilots and Capt. Poe was allowed to employ other pilots.

No training program as such, other than ground school, was organized.

Flight training was normally en route training and was given by one of the check pilots or another captain.

The overall program did not insure that all pilots were proficient according to the standards set forth in the operations manual.

It is apparent that this accident was operational in nature. Many things must be considered in properly planning and completing a flight. The general conduct of this flight clearly indicates poor judgment, carelessness, and lack of supervision and training. The fact that a Flight Plan and Log was not prepared prior to departing Newark and that the co-pilot did not know the route to be flown was the result of poor crew coordination and flight planning.

While it is not known exactly how much fuel was on board when the aircraft departed Newark, it is apparent that there was not a sufficient amount of fuel to fly to Pittsburgh by either of the planned routes and arrive there with any margin of safety. The elapsed time of the flight from take off to ditching was 2 hr. and 22 min.

Considering the altitude and distance flown and the various power settings which the co-pilot testified were used together with other known factors, it is calculated that approximately 260 gal. of fuel were consumed.

This would have made the aircraft over loaded at the time of takeoff.

The passengers' baggage when recovered weighed more than that shown on the

manifest. In addition, the operations manual required that the baggage of all crew members and the flight kit be weighed and this amount shown on the manifest. While it is not possible to determine with precise accuracy the total weight of all the above-mentioned items, it is obvious that the aircraft was overloaded at the time of departure.

The inclusion of any additional weight to the figures shown on the weight and balance manifest would have reduced the allowable fuel load below the minimum of 200 gal required for takeoff.

Capt. Poe estimated the flying time to Pittsburgh to 1 hr. and 40 min. The distance, along the route shown in the CAA flight plan, is approximately 271 miles. To accomplish this in the estimated time would require an average ground speed of 163 knots. With the wind along the route forecast to be from the northwest and west averaging over 17 knots at the planned cruising altitude of 4,000 feet, this ground speed is unrealistic.

Under these conditions a reasonable ground speed would be approximately 126-130 knots and would require an average elapsed time of 2 hr. and 7 min.

The Flight Plan and Log which Co-pilot Chapman prepared after departure included many mistakes, among which were: Wind directions and velocities different from those that were forecast; a higher true airspeed than is reasonable to expect for a DC-3 unless flying at higher altitudes, airways which differed from the route filed by Capt. Poe; some stations, courses, and radio frequencies that did not agree with either the filed CAA flight plan or the airways shown on the Flight Plan and Log; some errors in ground speed of 13 knots or more; and an estimated total time which exceeded the 1 hr. and 40 min. estimated by Capt. Poe. The estimated ground speed used was 148 knots, whereas the actual ground speed made good averaged only 126 knots.

The company operations manual states: "The average hourly fuel consumption for a DC-3 to be used in flight planning is as follows: 80 gal." Based on this figure the 225 gal. on board, as shown on the weight and balance manifest, should have allowed the aircraft to remain airborne for 2 hr. and 48 min. Instead the fuel was exhausted in 2 hr. and 20 min. of flight.

There are many variables such as power settings used, altitude flown, and load, to mention but a few, which must be considered in order to accomplish any flight at a specified average fuel consumption.

It could not be positively determined just where the aircraft was when it reported being over Johnstown at 2244; however, if it had been over Johnstown at this time, the average ground speed from Johnstown to the point of ditching would have been about 178 knots. This ground speed is unreasonable, considering the headwinds encountered in that portion of the flight and the fact that power was reduced to conserve fuel.

Co-pilots Chapman and Carter testified they believed they were over the Johnstown radio beacon and later over the airport area. However when there they did not see the airport rotating beacon, runway lights, or the lights of the city. These

lights were on at the time and should have been seen if the aircraft was in that vicinity.

It appears, therefore, that a navigational error must have been made and that the aircraft was actually some place else. As an example, it may have been over the New Alexandria radio beacon, which is approximately 27 miles west northwest of the Johnstown Airport and nearly on course between Westover and Pittsburgh.

One of the cardinal rules of safety which is set forth in the operations manual is "Pilots are not to pass up a refueling facility unless they have sufficient fuel and oil to reach the point cleared within reserve limits established."

On the subject flight, Capt. Poe was advised when the aircraft was near Philipsburg, an available refueling point, that to continue the flight would necessitate the use of reserve fuel. Again the crew demonstrated a decided disregard for the principles of safety by passing an acceptable DC-3 refueling airport.

The captain's judgment may have been influenced by his desire to accept the entire assigned payload in an effort to save money for his company. This limited the amount of fuel which could be carried and made necessary frequent and costly en route refueling stops. Because of this he may have elected to use a part of his reserve fuel to extend each leg of the flight.

It is incredible that an air carrier aircraft flown by accredited personnel could be forced down for lack of fuel on a short night flight in good weather when we think of the great progress aviation has made to date, particularly with respect to pilot training, aircraft instrumentation, navigational aids and airport lighting.

FINDINGS

On the basis of all available evidence the Board finds that:

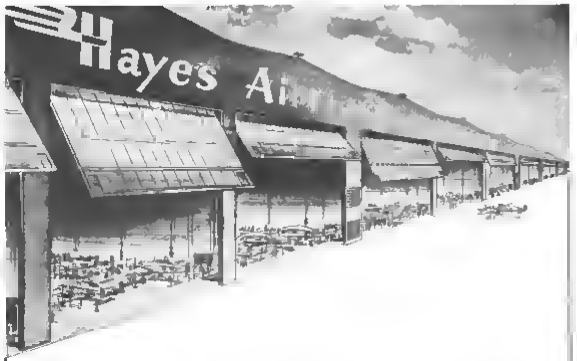
1. The crew, the aircraft, and the carrier were properly certificated.
2. The company did not properly check the competency of the crew in accordance with their operations manual prior to flight assignment.
3. The aircraft was overloaded at time of takeoff.
4. The flight was improperly planned, and was not conducted in accordance with the company's operations manual.
5. The captain, contrary to the company's operations manual, passed a suitable refueling facility after being advised that if the flight continued to its destination it would be necessary to use reserve fuel.
6. Weather along the route was good and approximately as forecast.
7. The aircraft was ditched in the Monongahela River, two miles from its destination because of fuel exhaustion.

PROBABLE CAUSE

The Board determines that the probable cause of this accident was fuel exhaustion brought about by inadequate flight planning. Contributing factors were inadequate crew supervision and training.

By the Civil Aeronautics Board:

Ross Rizley
Joseph P. Adams
Josh Lee
Chan Gurney
Harmar D. Denny



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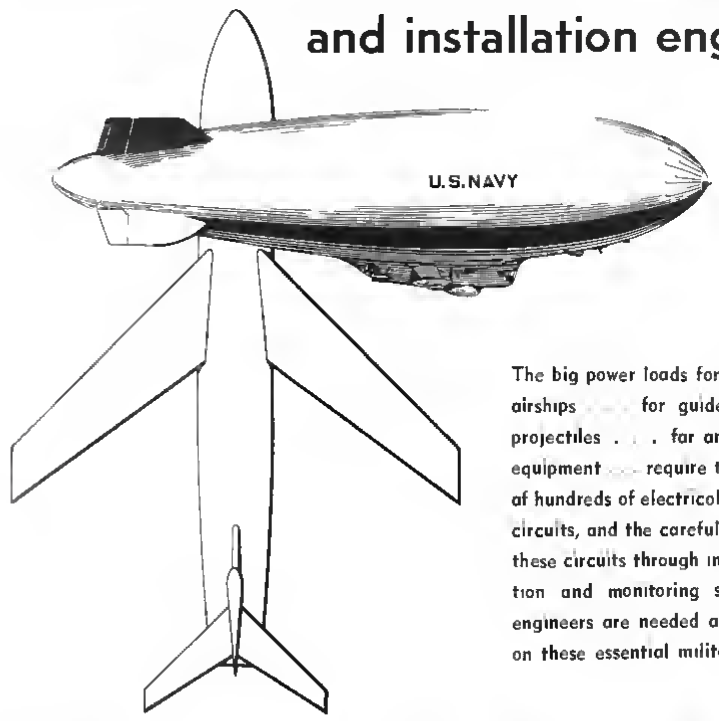

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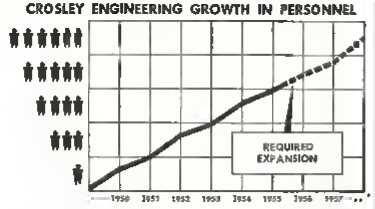

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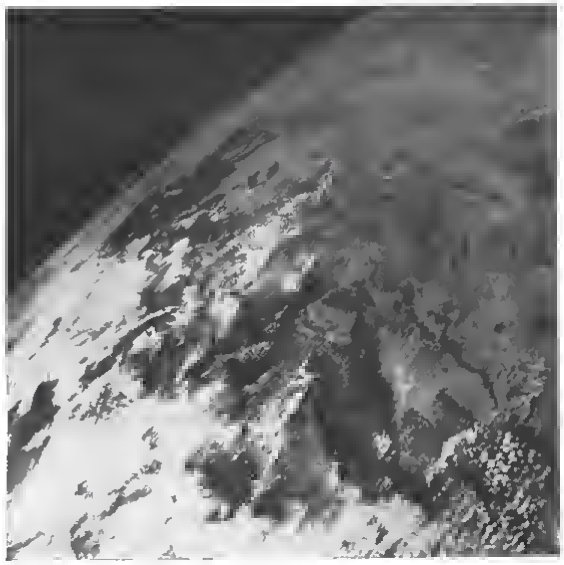

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Pacific Air Travel Heads for New Peak

Airlines see aircoach, credit plans, expanded hotel accommodations as reasons for 20-40% traffic gain.

By William J. Coughlin

San Francisco—Airline travel across the Pacific is expected to reach a new high this year despite the war threat in the Far East.

U.S. scheduled airlines flying trans-Pacific routes are preparing for their biggest season to date, following record first-quarter traffic. Northwest Orient Airlines is anticipating a traffic increase of more than 40% on its Pacific routes, Pan American World Airways expects a jump of at least 25%, and United Air Lines is counting on a 20% increase in its traffic to Hawaii.

Newer equipment is going into service and schedules will be stepped up to meet the growing traffic demand.

▶**Running Ahead**—"The Formosan situation doesn't seem to be affecting the travel picture at all," reports Herbert F. Milley, traffic and sales manager for the Pacific-Alaska Division of Pan American.

The Pacific picture not only is keeping pace with the airline boom predicted elsewhere but is running considerably ahead of it.

Pan American's Pacific travel, which increased 9% in 1954, gained 31% in 1955's phenomenal first quarter. The increase in traffic beyond Honolulu was even more spectacular, topping 50%.

The airline reports this was matched by an increase in charter flights, with charter revenue in the first five months totaling $1 million, compared to a $1 million total for 1954.

▶**Travel Factors**—Airline officials attribute the upswing to a number of factors:

• **Increased tourist interest.** Both Hawaii and Japan, for example, are expecting their biggest tourist year. This has been aided by the efforts of such organizations as the Pacific Area Travel Assn. and the Hawaii Visitors Bureau.

• **Expanded hotel accommodations.** This is particularly true in Honolulu. Airlines that formerly were forced to turn down passengers because hotel rooms were not available for them in Honolulu now can confirm hotel reservations when selling tickets.

• **Increased aircoach flights.** "Tourist flights appeal to the tourist," says a PanAm official. "It is largely the businessman on an expense account who flies first-class."

• **Pay-later plans.** "Fly now—pay later is a very definite business-getter," reports Northwest Airlines. "Lots of people are using it on the trans-Pacific service."

Pan American's deferred payment plan produced $3 million in revenue during the first eight months of its operation. Some 16% of all PAA pay later tickets sold were to Hawaii, compared with 7% of regular tickets.

▶**New NWA Airliners**—New equipment will play an increasing role in the competition for the trans-Pacific travel dollar.

Northwest is scheduling four flights a week to the Far East on its new Lockheed Super Constellations, three through to Manila with one turning around at Tokyo.

"We hope to expand this service in the future," says George E. Hatch, Western region sales manager for NWA. "Daily flights are in the planning stage."

The airline has now expanded its Super Connie service to Hawaii to three flights weekly. There also is DC-6B tourist service.

In an appeal to the East Coast trade, Northwest also provides service from New York to Hawaii on the "Hawaiian Express" Stratocruiser, departing from New York at 4:15 p.m. (EDT) and arriving Honolulu at 9:50 a.m. (HST) after stops at Minneapolis and Portland.

Northwest, which carried 9,565 passengers to and from Honolulu last year, is forecasting an increase to 12,480 this year. First quarter figures for 1955 showed 3,342 passengers, climbing from 1,743 last year.

NWA expects its traffic to the Far East to increase to 14,000 this year from 9,309 last year.

▶**Increased UAL Flights**—United Air Lines, which flies to Hawaii but not beyond, is increasing both its schedules and its equipment to keep pace with its competitors.

Starting on June 1 from Los Angeles, Calif., for example, UAL will double its first-class DC-7 service, going from two to four flights weekly. DC-6 coach flights will increase from six to eight a week.

United believes its two-abreast coach seating offers tremendous appeal to tourists making the long Hawaii flight on a limited budget.

"Our traffic to Hawaii was up over 20% in the first quarter, and we expect to do as well or better the rest of the year," says a UAL spokesman.

▶**Better Service**—All three airlines are planning to fight for a bigger share of the growing Pacific travel market. This means bigger advertising budgets and better service for the customer. "We intend to step up our promotion in a very substantial way," NWA reports.

There will be emphasis on food and beverage service for both the first-class and aircoach traveler. Cocktails, wines and liqueurs are served free on first-class flights.

Tourist passengers will find that meals are free and cocktails available for 50 cents a drink on some flights.

Pan American's first group of Nisei stewardesses began serving aboard Clipper flights on the San Francisco-Tokyo route last month in another sign of the quickening competition in the Pacific.

PAA officials expect them to offer some of the appeal of Japanese stewardesses on rival Japan Air Lines. Northwest also is considering hiring Nisei stewardesses for its Tokyo service.

At least one airline is considering both recorded music and inflight movies as new attractions on the long trans-Pacific flights.

It all adds up to an airline boom in the Pacific this year that will more than double the 10% increase in air travel predicted for the industry as a whole. (AW Apr. 25, p. 111)

AA Credit Plan

American Airlines is expanding its air travel credit plan on May 16 to offer credit facilities to the local service carriers.

American has developed a plan in conjunction with the Beneficial Finance Corporation to offer the local airlines the same credit facilities the larger carriers are finding so successful in promoting air travel.

A package installment plan which includes promotional material will be furnished by American. The company will also assume the financial risks of the program.

While designed primarily for travel on American, the plan can be used for travel on scheduled airlines anywhere in the world and can include the ground portion of package vacations.

Operators Label Copter CAR Premature

An immediate boost for helicopter manufacturers is visualized in the current Civil Aeronautics Board draft release of expanded airworthiness requirements for rotorcraft. At the same time, commercial helicopter operators view the Board's proposals as premature considering the real future of commercial helicopters to be eight to 10 years away.

Both the manufacturers and the operators participated in several years of joint effort by CAB and CAA to revise and enlarge present helicopter airworthiness regulations. The decision, now, is to establish three categories of helicopters—small, medium and large multi-engine—with corresponding airworthiness requirements.

CAB's notice of proposed rule making (DR N9. 55-11) would establish a new Part 7 and amend Part 6 of the Civil Air Regulations. The proposed Part 7 is to provide for two transport categories of helicopters. Amendment of Part 6 is for simplification of requirements for small helicopters. Deadline set by the Board for additional comment from interested parties is June 15.

▶ **Army Approves**—The manufacturers are agreeable to such new rules because they see in them the only yardstick to apply in seeking an airworthiness certificate. Also, it is known that the Army has been prodding CAB to expedite its helicopter requirements. Army intends to include them in specifications for its own future procurement, another advantage to the manufacturer. The Airworthiness Requirements Committee of the Aircraft Industries Association is prepared to accept the Board's proposal subject to requesting a number of changes and deletions.

On the other hand, the commercial operators—both present and prospective—are concerned with being burdened by excessive regulation at this stage. They contend the helicopter business is not sufficiently developed to restrict it with a large volume of rules.

▶ **New Distinction**—What the two industries are being asked to live with are new regulations designed to make a distinction between large and small helicopters and between helicopters intended for general use and air carrier service. The presently effective helicopter airworthiness requirements contained in CAR Part 6 make no such distinction.

Requirements of Part 6 were based primarily upon experience gained with helicopters of relatively small size. Those requirements are considered unsuitable for large helicopters under development. The desire is to establish new rules for helicopters which will not only be larger but intended for use in air carrier service.

Recommendation of CAB's Bureau of Safety Regulation is to establish three helicopter categories, Normal, Transport A and Transport B. "Normal Category" would be for relatively small helicopters. "Transport Categories A and B" are for large helicopters intended for air carrier service. Requirements for eligibility in each classification is as follows:

- **Normal Category**—Limited to 6 000 lbs or less maximum weight; operations limited to visual flight rules (IIVR) only; eligible for all passenger and cargo operations except in certificated schedules and irregular air carrier service.
- **Transport Category A**—Required to be multi-engined, no maximum weight limitations; eligible for all types of operations but subject to compliance with appropriate performance operating limitations when used in air carrier service.
- **Transport Category B**—Limited to 17,500 lbs or less maximum weight, operations limited to visual flight rules (IIVR) only; eligible for air carrier service subject to compliance with performance operating limitations and certain route limitations.

Having established these requirements for three helicopter categories, CAB proposes to amend presently effective Part 6 and make it applicable only to Normal Category helicopters. The two transport categories are to be governed by the new Part 7.

▶ **Some Objections**—The provisions for Normal Category or small helicopters would be simplified. Most significant would be the limitation of requirements for scheduling performance and the necessity of providing a flight manual. Transport Category B is covered by the present Part 6 plus a number of additionally proposed requirements.

The provisions for Transport Category A are entirely new and include proposals covering single engine performance, fire prevention, engine installation and detail design requirements.

General industry acceptance of the proposed rules is expected. However even the manufacturers have made exceptions. Major objection is to the weight limitation of 17,500 lbs for Transport Category B helicopter for both passenger and cargo operations.

Anti-Trusters Focus on Airlines

House Judiciary Committee, aiming to tighten anti trust law, focused on the air transportation industry last week.

Sen. Joseph O'Mahoney and Rep. Henry Reuss charged domination of Civil Aeronautics Board by the scheduled airlines to maintain a "closed door" to new enterprise.

Rep. Emanuel Celler, chairman of the subcommittee on monopoly, suggested that airline mergers be prohibited and entry liberalized.

▶ **Fears Concentration**—As counsel to North American Airlines during a "leave of absence" from the Senate, O'Mahoney said he discovered that air transportation illustrates that "concentration of economic power will take over control of the government—perhaps unconsciously."

He pointed out that 96% of air traffic is held by the "grandfather" airlines, and only four percent by new lines certificated since the 1938 Civil Aeronautics Act. "Free enterprise has only a foot in the door and that foot is being squeezed," he declared.

Pointing out that the White House staff grew under the Roosevelt and Truman administrations and "is still growing," he criticized the policy of the chairmen of CAB and other agencies of "getting word from the White House" before they make quasi-judicial decisions.

▶ **Would Shun Advice**—His solution: require all Board members to take an oath of office that they will not take advice from any source, but base decisions solely on hearing testimony and facts.

He also suggested longer terms for Board members "for greater independence."

O'Mahoney singled out Pan American World Airways as being "economically greater than most of the nations of the world."

Reuss cited the Pacific case as "a horrible example of how the government itself tries to create monopoly." Secretary of Commerce Sinclair Weeks, Reuss declared, "got the President in one of his unguarded moments to overrule a unanimous decision of the CAB removing Northwest Airlines entirely from the Milwaukee-Honolulu route and giving PAA a monopoly—though Northwest was willing to perform the flight without a cent of subsidy. Fortunately the protests were long and loud. The President had to back down and reverse himself." (AW Feb 14 p. 12)

CAB Reverses Examiner, Will Not Approve HAL Convair Operation

In a sharp reversal of an examiner's findings, the Civil Aeronautics Board has decided not to underwrite Hawaiian Airlines' Convair operation in setting mail pay for HAL and Trans-Pacific Airlines.

The Board also made sharp cuts in mail pay recommended for past and future periods for the two Hawaiian carriers. The decision sets mail pay for HAL at $238,073 for the period September 3, 1953, to February 28, 1954, and $187,363 annually for the period starting March 1, 1955. This will mean a refund of $137,179, since the carrier received $375,252 during the September-February period.

Mail pay for Trans-Pacific for the period January 8, 1953, to February 28, 1954, is set at $410,324. For the future period starting March 1, 1954, mail pay is $59,878 a year.

▶**Examiner Overruled**—These figures represent reductions from recommendations of Examiner Herbert K. Bryan, who provided $434,495 for TPA and $605,502 for HAL for the past periods, and $95,056 for TPA and $671,626 for HAL for future periods.

Central issue in the case was Hawaiian's operation of Convairs. The company took delivery on five 340s early in 1953 in an effort to combat inroads made by TPA since its certification in 1949.

Initially, there was a marked impact on TPA traffic and breakeven need increased from $151,072 in 1952 to $337,931 in 1953. Since then, the novelty has worn off and TPA's reported breakeven need for 1954 was $94,873.

At the same time, Hawaiian's dependence on mail pay for its mixed Convair-DC-3 operation has increased from a reported breakeven need of $222,139 in 1951 to $821,797 in 1953, despite steady increases in traffic.

▶**Follow Domestic Policy**—The CAB has decided not to underwrite the operation of Convairs by HAL and has based its mail pay on an all DC-3 operation. This policy is similar to that followed in setting mail pay for domestic local service carriers.

The Board finds no support in the record for the examiner's contention that the Board has to support additional costs of re-equipment for smaller carriers to encourage economic development of air transportation. The CAB decision mentions that a local service carrier, Southwest Airways, succeeded in reducing mail pay requirement with the use of a mixed fleet of Martin 2-0-2s and DC-3s. Two other local carriers are planning to put Convair or Martin equipment on their routes within the next few months, in spite of the Board's policy of not underwriting such ventures.

As to the superiority of the Convair in Hawaiian operations, CAB points out that HAL's share of the total market has slipped from 72.51% in 1953 to 70.41% last year, indicating that the diversionary advantages of the Convair were temporary.

▶**Board is Skeptical**—CAB finds little probability that HAL will reach an economical basis of operation with the 340s.

In view of the short haul nature of Hawaiian operations, the speed advantage of the 340 over TPA's DC-3s is negligible. Over the average passenger haul of 131 miles, the Convair advantage is 10 minutes. The CAB foresees no traffic volume in the immediate future which would make the Convair operation economical.

The Board also finds that HAL made little effort to reconcile capacity with traffic and expanded capacity beyond the traffic potential at the expense of its load factors.

The Board reaches the conclusion that HAL was engaged in a deliberate program, in which the Convair purchase was an integral part, to offer a volume of capacity which would blanket the market and forestall TPA's efforts for competitive survival."

In its decision, CAB expresses the conviction that a carrier on subsidy must, in making management decisions, consider the effect of those decisions on subsidy need. According to CAB, factors of competitive advantage which are of primary concern in other industries must be subordinated to the effect on required subsidy.

"We regard this of importance," says the decision, "not only to protect the federal treasury from an unwarranted drain, but also to preserve for the traveling public the full benefits of a competitive service."

IATA Announces Family Fare Plan

A family fare plan is the latest effort of trans-Atlantic airlines to boost traffic during the slow winter season.

The International Air Transport Assn. announced an airline fare program for the November 1 to April 1, 1956, off-season which features substantial reductions for family travel as well as adjustments to narrow the gap between winter and summer passenger fares.

Under the family plan, the head of the family pays full fare. Other members—wife or husband and children between 12 and 25—pay a reduced fare. Children under 12 are already eligible for a 50% fare cut.

Savings amount to $150 one way and $300 round trip for first class and $130 and $200 for tourist service.

The fare differential between seasons has been reduced to $30 for first class and $40 for tourist for a round trip. Present differential is $80 and $97.

CAB to Survey Freight Forwarders

The future of International Air Freight Forwarders will be determined by a general investigation instituted by the Civil Aeronautics Board.

The Board will make a general survey of forwarders engaged in transportation of property between the United States and overseas points as a review of the first five years of regulation. The international forwarders began operations under present rules in 1950, and their five-year authorization is up in August.

Domestic forwarders are currently under review in another investigation and an examiner's report is now waiting Board action.

All present holders of letters of registration, all applicants and the Railway Express Agency have been included in the proceeding. The case will also be concerned with the extent to which the CAB should attempt to regulate foreign citizens operating as forwarders from foreign countries.

Examiner Approves New Capital Service

Direct nonstop service between Norfolk, Va., and Atlanta to be performed by Capital Airlines has been recommended by Civil Aeronautics Board Examiner Curtis C. Henderson.

The case stems from an application of the Norfolk Port Authority, asking the CAB to remedy the deficiency in service between the Norfolk area and the Southeast and Southwest. Capital, Delta-C&S Air Lines, Eastern Air Lines and National Airlines all applied for the direct service.

Examiner Henderson finds that Capital should perform the service since it already serves both points via Asheville, N. C.

The examiner recommends that the carrier be authorized to overfly Asheville and fly directly between Norfolk and Atlanta. Certification of any of the other applicants would involve adding a new point to their systems.

Australian Airlines Want More DC-6Bs

(McGraw Hill World News)

Melbourne—Nationalized Trans Australia Airlines and privately owned Australian National Airways are pressing the government for permission to buy more DC-6Bs from Douglas Aircraft Co.

TAA wants dollars to cover the cost of at least one U. S. built airliner and is trying to convince federal officials that it needs two. Australian National is asking for a foreign exchange allocation to purchase two DC-6Bs.

▶ **DC-6B vs. Viscount**—Trans Australia had believed its fleet of seven turboprop-powered Vickers Viscounts would eliminate the need for other transports. But the British airliners are making a poor showing against ANA's DC-6Bs on the domestic route between eastern and western Australia.

Australian National is carrying 52 passengers plus about 7,000 lb. of cargo in its Douglas transports, compared with the Viscount's 32 passengers and some 2,000 lb. of cargo. Whenever westerly winds exceed 80 knots westbound Viscounts have to put into Kalgoorlie for refueling while DC-6Bs make the flight nonstop.

▶ **Higher Expenses**—The turboprop airliners are increasing TAA's operating expenses on the domestic route. Trans Australia had flown 50-passenger DC-4s until the DC-6B's popularity on ANA flights forced the switch to newer equipment.

Now TAA is operating two Viscounts on seven nightly roundtrips a week, plus two daytime DC-4 flights. This gives the airline a total capacity on the route of 324 seats a week, compared with 350 when only seven DC-4 roundtrips were flown.

▶ **Sudden Interest**—Trans-Australia executives say the Viscount is not designed for this domestic operation, the reason for their sudden interest in DC-6Bs.

Australian National officers report they want to buy more of the transports because their fleet of two DC-6s and two DC-6Bs have proved "extremely popular" in this country and suitable to conditions and operating requirements here.

ACC Panel Studies Airspace Problems

A survey of airspace utilization is being made by the Air Coordinating Committee's Airspace Panel. Emphasis will be on restricted, warning and control areas in connection with the overall problem of diminishing airspace. The panel also will study jet penetration procedures and other activities which are generally associated with airspace utilization.

ACC's Airspace Panel, assisted by eight regional subcommittees, is charged with preventing and eliminating conflicts in the use of airspace which may arise from proposals to establish prohibited or restricted areas and obstructions to air navigation. Objective of the current survey is to inform ACC on specific areas in which conflicts now exist and where trouble may be anticipated.

Copter Charters Anywhere

Airwork, Ltd., and a British helicopter operator are forming a new company designed to undertake rotary charters anywhere in the world.

The independent U. K. airline and Fisons Pest Control, Ltd., agricultural copter operator will be equal shareholders in the new operation—to be known as Fison Airwork.

Eight Hiller helicopters now owned by Fisons, combined with Airwork's fixed-wing fleet will cover activities including executive charters, aerial surveys and engineering construction work plus spray/dust flights.

Airwork will administer all business other than agricultural charters. These will be handled by Fisons.

Local Service Lines Assured Certificates

The 14 local service airlines appear certain to become a permanent part of the domestic air transportation network.

Commerce Department has informed members of the House and Senate Commerce Committees that "the Administration has no objection" to legislation directing Civil Aeronautics Board to grant permanent certificates to the 14 lines.

The statement was made as Congress completed action on the bill.

On Capitol Hill, this was taken as assurance that the White House would approve the measure.

Two main provisions of the legislation, as they were sent to the President are:

- CAB would be required to grant permanent certificates to all local service lines "continuously" in operation since Jan. 1, 1953, who filed applications within 120 days after enactment, unless the service has been 'inadequate and inefficient.'
- CAB would have discretion to withhold from permanent certification "not more one half of the intermediate points" on a carrier's system that "generated insufficient traffic . . ."

Pilot Retirement Plan Cuts Age, Raises Pay

Air Line Pilots Assn. is pushing through a pension program that cuts the minimum retirement age to 50 and sets up payments ranging from more than $3,600 to $9,600 a year.

In the first contract signed under the new plan, Pan American-World Airways agreed to the lower age and higher retirement pay after more than a year of negotiation (AW May 2, p. 86). Northeast Airlines followed with an agreement setting up a pilot pension program similar to PAA's.

ALPA now is trying to negotiate a third contract with United Air Lines.

Contracts with PanAm and NEA call for an A fund with fixed benefits paid entirely by the airlines, and a B fund that consists of 6% of the pilot payroll. Pilots contribute 3% of the second fund, and the company makes up the rest.

Dividends from equity-type securities are expected to increase retirement pay from the B fund by at least 2% a year.

Under the Pan American agreement, a pilot with 25 years of service and earnings of $13,000 a year can retire at 60 with an annual pay of $9,665—if he received the full 2% appreciation. Without this increase, his pension would be $7,878 a year.

At the other end of the scale is the pilot who retires at 55 with no accumulation of dividend. His annual pay would be $3,693.

If an ALPA member retires at 50, his pension would be about 6% less than the payments at 60.

Wilson New Deputy At Commerce Dept.

Thomas Bayne Wilson has been sworn in as Deputy Under Secretary of Commerce for Transportation. He will serve as deputy to Louis S. Rothschild, the Under Secretary for Transportation.

A former member of the Kansas State Legislature, Wilson comes to the Commerce Department from the General Services Administration where he was Deputy Commissioner for the Emergency Procurement Service.

Wilson has had wide experience with many forms of transportation, including service with Trans World Airlines. He has been an executive of various railroad, trucking and steamship companies and was Chief of Transportation for the Southwest Pacific Area on the staff of Gen. Douglas MacArthur in World War II. He served as chairman of the Board of TWA from 1938 to 1947.

CAB ORDERS

(Apr 28 May 4)

GRANTED

Western Air Lines and **Braniff Airways** leave to intervene in the New York-Mexico City nonstop case on the sole issue of the validity of the certificate of Eastern Air Lines for a New Orleans, La.-Mexico City route

Slick Airways an exemption to permit an agreement for the lease of three C-46s from American Air Export & Import Co

Flying Tiger Line an exemption to perform 20 charter flights from London-Paris-Brussels, Bremen, Munich, Milan and Athens to New York pursuant to a contract with the Intergovernmental Committee for European Migration. FTL also was granted an exemption to transport agricultural laborers between points in the United States and in the British West Indies, British Guiana and British Honduras, subject to certain restrictions, until May 31, 1956

North Central Airlines an exemption to permit one daily round-trip flight between Chicago and Duluth via Milwaukee and Green Bay until 60 days after decision in the North Central certificate renewal case. An investigation of the service is ordered and consolidated with the renewal case

Ozark Air Lines permission to serve Nashville, Tenn., through Berry Field

Purdue Aeronautics Corp. an exemption to perform various charter flights to Canada and Cuba

APPROVED

Agreement between Trans World Air lines, Continental Air Lines and various other carriers relating to intercompany arrangements

Resolutions adopted by the International Air Transport Assn. between various airlines relating to North Atlantic cargo rates, South Atlantic fares and North and Mid-Atlantic promotional off-season fares

Flying Tiger Line's agreement with Trans Caribbean Airways for lease of one DC-4 by FTL

Air Transport Assn.'s amendment of its articles of association to increase membership of the board of directors from 10 to 11

Extension of temporary suspension of Seattle-Houston interchange service between United Air Lines and Braniff Airways until Oct. 1, 1955

ORDERED

Continental Air Lines' rate for carrying surface mail on the route transferred from Pioneer Air Lines be fixed at 30 cents a ton-mile

Catalina Air Transport to inaugurate service between Los Angeles and Catalina Island during the period ending Aug. 1, 1955. Catalina's application for temporary suspension of service was ordered set for future hearing and petitions of Southwest Airways, Channel Airways and Channel Air Service consolidated with the Catalina application for hearing and disposition

United Air Lines' exemption authority to provide free transportation to technical employes of Sperry Gyroscope Co. for inflight observation extended for six months from May 3, 1955

Suspension of certain fares filed by Great Lakes Airlines extended to Aug. 7, 1955 to allow added time for investigation

Suspension of certain fares filed by Currey Air Transport Ltd. extended to Aug. 9, 1955, to allow added time for investigation

DISMISSED

Delta-C&S Air Lines' complaint against summer excursion fares proposed by Delta, Eastern Air Lines and National Airlines, for lack of facts that warrant suspension or investigation

Investigation and suspension of certain fares filed by Trans Caribbean Airways, since the fares have been canceled

Island Air Ferries' application for a certificate of convenience and necessity, for lack of prosecution

North Central Airlines' petition for leave to intervene in the service to Sioux Falls case. North Central's motion to consolidate the case with the Frontier renewal case was denied

Joint application of William R. Boyd, Katherine L. Boyd and All American Airways for approval of a stock sale. At the time of the application Boyd was president of Riddle Airlines and he and Mrs. Boyd owned certain Riddle stock. Boyd has resigned as officer and director of Riddle and the Board has dismissed the proceeding at the request of the carrier finding he and Mrs. Boyd do not control Riddle

DENIED

Riddle Airlines' application for an exemption to operate over routes certificated to U. S. Airlines since the issues are being reviewed in the all-freight renewal case

National Airlines leave to intervene in the case involving nonstop service between New York/Washington and Mexico City

Resort Airlines petition for reconsideration of an earlier decision which denied a request that certain Resort applications be consolidated with the carrier's certificate renewal case. Also denied was Resort's petition for a 12-month deferral of procedural dates in its certificate renewal case

Swissair Pilot Program

(McGraw-Hill World News)

Geneva—Swissair will start a pilot training program next fall in an effort to end the shortage of Swiss crews that has confronted the airline for the past 30 years. By 1957 or 1958 Swissair expects all pilots to be furnished by the school

The airline now is selecting candidates, restricted to Swiss nationals for the first one-year training program. The course will start with basic flight fundamentals and end with advanced training in DC-3s.

Swissair has been forced to go beyond its country's borders to recruit pilots since it started operating in the 1920s. Last year, a nation-wide publicity campaign to draw experienced nationals into the airline brought little response from either military or civilian pilots.

SHORTLINES

▶ **Sabena Belgian World Airlines** opened its own catering kitchen recently near Idlewild International Airport, New York. Facilities are set up to provide 160 meals per day for flights departing from New York.

▶ **Aer Lingus** carried a record 342,765 passengers in the financial year ending March 31, 1955, an increase of 14% over the previous year. Load factor was 72%, compared with 70% for the preceding period.

▶ **Air Transport Association** reports that scheduled airlines carried over 3,000,000 passengers a month for the first time in April. Revenue passenger traffic for the first quarter was 21.7% above the figure for first quarter 1954. Airlines Clearing House interline business amounted to $50,062,347 in March, a 22% increase over March, 1954. Passengers fatality rate for U.S. scheduled airlines was .21 per 100 million passenger-miles for the 12 months ending in April.

▶ **Airwork Atlantic** will increase trans-Atlantic cargo schedules to three flights weekly on May 17.

▶ **Avianca** is reported to have sold its five C-46 cargo aircraft and replaced them with DC-4s, bringing its fleet to a total of 13 DC-4s. The carrier is also reported to have bought a number of R2000 engines.

▶ **Avensa**, Venezuelan affiliate of Pan American-World Airways, has received two new Convair 340 aircraft. The delivery brings the carrier's Convair fleet to five 340s, all of which are used on domestic routes.

▶ **The Colombian** government has raised its transportation tax on travel abroad from 3% to 40%.

▶ **Lake Central Airlines** boarded a record 8,755 passengers in April. Lake Central had a profit of $4,574 in the first quarter, compared with a loss of $43,868 in the same period of 1954.

▶ **National Airlines** flew 94,967,000 revenue passenger-miles in April, a 32% gain over April, 1954.

▶ **North Central Airlines** showed a profit of $10,421 in the first three months of this year, compared with a $191,431 loss in the same period last year.

▶ **Trans World Airlines** April traffic recorded a 10% increase over the previous year.


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EDITORIAL

Secrecy Menaces Technical Progress

Recently declared intention of the Defense Department to discourage publication of unclassified technical information, now circulated freely among scientists and engineers, (AW May 2, p 17) gives the aircraft industry a new interest in basic problems of press freedom. Part of an old cause to the newspaper profession, this new trend was discussed at length at a recent meeting of the American Society of Newspaper Editors. One of the speakers was Dr. Malcolm C. Henderson, a former Atomic Energy Commission official now a professor at Catholic University. Here are some pertinent excerpts from Dr. Henderson's address.

"I feel there is a very real and continuing need-to-know on the part of the intelligent public, a need that goes much deeper and is much more important than the present administration with its constantly increasing restrictiveness seems willing to grant . . .

". . . There is obviously a feeling in high places here in this country that any information, classified or not, will help our enemies too much. Evidently the Soviets feel this way too. Even the day the apple trees blossom in the Ukraine and the day the ice goes out of the Nova are classified items, not to speak of census figures, production rates on any commodity, and all sorts of other things that we make no bones about publishing—as yet. There is a blind faith in this country that somehow more and more secrecy will somehow save us. I want to urge most emphatically that the criterion should always be the simple one. Does releasing an item help the enemy more than it helps us? If, in the judgment of the expert who knows the whole picture, it does so, then it should be kept classified at an appropriate level. If it does not, then it should be unclassified and available for publication . . .

". . . The only way we can get the full good out of technological advances is to have them widely known. Suppression of classified material, while necessary, is bad enough, but the suppression of non-classified material—strategic information we are to call it now—is much worse. What will happen is that suppression in the newspapers must of course be accompanied by suppression in all media, and in particular in the technical journals, trade papers, house organs, proceedings of learned societies and everywhere that technical material of general interest is published. Now, when the technical journal is censored for unclassified material as well as classified, the technician, engineer, and scientist will really have blinders and earmuffs put on him. It is just this sort of information that keeps him active, interested and productive, and it is to the wide dissemination of such information that American technology owes a large measure of its success.

"It is all very well to talk of a gray area, not classified or classifiable, but important to an enemy, of which every editor is supposed to learn enough to avoid publication of items in it when they reach him. I cannot see how such a vague responsibility could be expected to work in peacetime—or over a long term of cold war. Just as in war, the world is at the mercy of the most warlike, so here the press is at the mercy of the least responsible member. In suppressing or controlling information that is not classified or classifiable we will lose valuable advantages and get nothing in return, not even secrecy, let alone security . . .

"The real handicap the people on my side of this argument have to face is that the damage that can result from incautious publication is evident, immediate, and direct, and the discussion about it is fraught with the emotions raised by an apparent attack on security. On the other hand the benefits that follow from real candor in areas even where it is fully justified have to be explained, they are long-range, indefinite, and seem merely traditional. I earnestly believe, nevertheless, that the benefits are very real and important, and that by foregoing them we jeopardize some of our most precious liberties, as well as impeding technological progress.

"From where I sit, it does no good for the administration to disclaim any attempt at censorship. Censorship is no less censorship because it is informal and voluntary. Let us have restrictions on classified information, and let us put teeth in the law so we can prosecute and convict those who leak classified material, but let's put no faith in a general atmosphere of secrecy in a gray area. I fear that the only permanently gray area will be the heads of the editors who try to live with the concept of strategic information.

". . . We are faced here with something quite basic in the two ways of life: the Communist and the Democratic. It is a part of the price we pay for being a democracy that we cannot control all we would like to in the way of information about ourselves without in some measure ceasing to be a democracy. In Russia all information is classified except what is specifically DK'd for release. In this happier country only designated things are withheld. Once we get to a state where we permit the borders of the classified realm to be fuzzy, or put the responsibility on the editors to withhold certain types of information in peacetime, without adequate training—and I doubt if any training could be adequate in this context—we are on the road to complete control of the press and all information media.

"One of the current and extensively believed myths, popular particularly with the services, is that a compendium of information is a great deal more valuable than the individual items contained in it. This belief accounts for some curious anomalies of classification, where every item in a document may have been published but the document carries a **CONFIDENTIAL** rating . . . There is, of course, just a little merit in this contention, but the restrictive results are considerable. The most we can gain by classifying the compendium is a few months' or weeks' time; the time it takes an intelligent compiler to pull the material together. Don't you think the enemy has made such compilations?

"In approaching the problem generally, there are two basic errors we must avoid. We must not assume the enemy to be superhumanly intelligent and completely successful in espionage, nor must we consider them completely stupid. If they are brilliantly successful in penetrating our security, then we have everything to gain by telling our own people everything as soon as possible. If they are stupid, then we have something to gain by covering up for a little while, even those things that are pretty obvious, until the handicap to our own progress is serious. It seems to me, that in spite of all the evidence to the contrary we still lean toward the side of thinking the enemy stupid."

The MASTER AIR DATA COMPUTER

Another
SERVOMECHANISMS
Building Block
System

The Master Air Data Computer provides a single coordinated source for input information required by the various aircraft control and instrumentation systems. It is a central "clearing house" for aerodynamic intelligence. There is no fundamental limit to the number of functions, outputs or services that this computer can perform.

The Moster Air Data Camputer represents onather outstonding example af Servamechonisms' design philasaphy. As o result af aur camplete and careful analysis af the problem, aur engineers have develaped a series af standard plug-in campanents which, when assembled in "building black" foshian, praduce mony versions af the Master Air Data Computer—eoch far a specific opplication. Consequently eoch requirement can be toilared quickly and ecanamicolly thraugh the use af selected "building blocks." At most, anly ane ar two af the "building blocks" require ony internol chonges. The remoining campanents are standard for oll canfiguratians. In oddition to the fost ecanamicol ond accurate solutians to aur custamers' problems, oll plug-in campanents of the some type ore completely interchangeoble thus insuring **moximum** reliobility thraugh simplifying maintenance in the field.

Servamechanisms praven ability ta **onticipote** and **interpret** aur custamers' needs, to **design** ta specifications, ta **produce** in quantity ond **follow-up** throughout the life af the delivered equipment, all add up to o **complete service.**

Write for Air Data Computer Brochure, GA3

Typical example of Servomechanisms "building block" philosophy. Both the Convair F102 and the Northrop F89 use variations of this computer. One requires somewhat different information than the other. A simple change in one of the plug-in "building blocks" and the equipment became custom made for each aircraft.

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